



P.R. new

MAY 1960

Current Anthropology

A WORLD JOURNAL OF THE SCIENCES OF MAN

OUR READERS WRITE, 193

EUROPEAN AND NORTHWEST AFRICAN MIDDLE PLEISTOCENE

HOMINIDS *by F. Clark Howell*, 195

PANORAMA OF DANCE ETHNOLOGY *by Gertrude Prokosch Kurath*, 233

NEWS • NEEDS • OPPORTUNITIES

NEW CONFERENCE CENTER AT BURG WARTENSTEIN, 255

THE HUMAN RELATIONS AREA FILES, 256

SERIAL PUBLICATIONS, 256

1959 VIKING FUND MEDALISTS, 257

WANTED, 257

SCHOLARSHIPS AND FELLOWSHIPS, 258

INSTITUTIONS; FUTURE MEETINGS, 258

CONGRESSES: STUDY OF THE FOLKTALE, 259

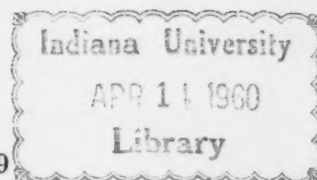
CZECHOSLOVAK ANTHROPOLOGISTS, 259

CONFERENCE: TECHNOLOGY AS A BACKSTOP TO

ANTHROPOLOGY AND ARCHAEOLOGY, 259

PUBLICATIONS RECEIVED, 262

CALENDAR, inside back cover



Current Anthropology

is published six times a year in January, March, May, July, September, November at the University of Chicago, 1126 East 59th St., Chicago 37, Ill., U.S.A. Subscription price in U.S.A. \$10 a year. Second-Class postage paid at Chicago, Illinois, and additional mailing office.

VOL. 1 • NO. 3 • MAY 1960

CURRENT ANTHROPOLOGY is a journal published six times a year in English for the world-wide community of scholars concerned with the anthropological sciences, including biological, cultural, and social anthropology, linguistics, archaeology, and prehistory. The Associates in CURRENT ANTHROPOLOGY form a co-operating group of scholars who exchange knowledge and ideas through this journal, and are dedicated to the achievement of a full and free world-wide exchange of knowledge. Institutions that accept an invitation to become institutional Associates in CURRENT ANTHROPOLOGY assume the same obligation. Both categories of Associates receive the journal and pay only a nominal fee (20% of the subscription rate) because their active participation entails supplementary expenses. Students in the central disciplines and scholars in closely related fields may be recommended by Associates for subscriptions at a special rate (40% of the regular rate). Anyone may subscribe at the regular rate (see back cover).

History

Since its founding in 1941, the Wenner-Gren Foundation for Anthropological Research, Inc., has recognized the value of world-wide scholarly interchange among the sciences of man. Thus in 1952 it sponsored an International Symposium of Anthropology, which resulted in the publication of *Anthropology Today*, *Appraisal of Anthropology Today*, and the *International Directory of Anthropological Institutions*. These were followed in 1955 by the publication of an experimental *Yearbook of Anthropology*, part of which was republished in 1956 under the title *Current Anthropology*, whence the title for the present journal.

Continuing toward this goal, the Foundation founded CURRENT ANTHROPOLOGY in 1957. Many possible forms for CURRENT ANTHROPOLOGY were discussed in conferences and by correspondence with scholars throughout the world. The conference that inaugurated Burg Wartenstein (in Austria) as the European headquarters of the Wenner-Gren Foundation established these broad principles for CURRENT ANTHROPOLOGY:

1. The journal should encompass all problems of the anthropological sciences, bringing together a wide variety of relevant ideas and data, and facilitating international communication.

2. It should be holistic.

3. It should provide a means by which anthropologists can exchange information about their current activities.

During the following year, with the help of colleagues at meetings in all parts of the world, these principles were developed into the present plan.

Associate Status

CURRENT ANTHROPOLOGY unites scholars and institutions regardless of nationality or political affiliation. In return for membership at a nominal rate, it is hoped that Associates will participate by recommending new Associates, by submitting articles, news, and other material of interest to other Associates, and by responding to requests of the Editors for comments on articles.

Contents

CURRENT ANTHROPOLOGY publishes two classes of material: review articles, and news and reference material. While CURRENT ANTHROPOLOGY will doubtless include some articles that other journals might publish, its very broad geographical and theoretical interests will make extensive duplication of other journals unlikely. The function of CURRENT ANTHROPOLOGY as a clearinghouse for all scholars of the anthropological sciences is new.

Review Articles

A "review article" is a major survey of knowledge on any topic relevant to the sciences of man. New material at the growing points of anthropology, and new evaluations, are preferred over syntheses of what has become well-known, but the new should be placed in the context of the known. A review article may be a review of literature, data, research, a method, etc., and its limits may be drawn in terms of time, geography, or some other criterion. It should generally include a delineation of its baseline, or a concise summary of past developments which then serves as the baseline. Its topic should be ambitious in scope, and the coverage of that topic comprehensive, well illustrated by concrete cases, interpretative, and forward-looking. It should contain an extensive bibliography. The author, being a specialist in one field addressing specialists in other fields, should strive for simple clarity of presentation, particularly in the terminology employed for concepts. The article may be as long as is consistent with the material it covers, provided that sensible canons of selection are observed. Illustrations are welcomed.

CURRENT ANTHROPOLOGY review articles normally receive "CA★ treatment." That is, after an article has been provisionally accepted, it is duplicated and sent for comment to a number of Associates who are expert or clearly interested in the subject. This is done as a first act of the constructive intercommunication which is our purpose for existence. Notwithstanding that these comments are solicited, they are conceived as "manuscripts," and their publication is accordingly subject to the judgment of the Editor. Commentators are selected on the basis of individual-interest data cards completed by each Associate and on file in the office of the Editor, and of recommendations by the author. Each commentator is invited to submit two kinds of comments: one kind is directed toward making corrections or additions

Continued on inside back cover



pol-
rent

gues
ples

itu-
. In
ped
new
ma-
ling

ma-
rial.
ude
very
ake
The
ouse
w.

e on
rial
lua-
ome
con-
v of
mits
ome
nea-
vel-
ppic
that
ases,
tain
cial-
elds,
licu-
The
erial
are

y re-
has
sent
pert
as a
nich
nese
anu-
ct to
eted
eted
itor,
nen-
one
ions
over

Our Readers Write

[CURRENT ANTHROPOLOGY is] a very excellent idea that could lead to an Encyclopedia of Anthropology; just what is urgently required.

M. D. W. JEFFREYS

I am very excited about the prospects for CURRENT ANTHROPOLOGY. Ours is a relatively small profession in which many of us find it difficult to benefit especially from the work of our foreign colleagues.

REV. GERALD DESMOND

The proposed world journal is an excellent and sadly needed addition to all areas of anthropology.

RICHARD H. OSBORNE

The plans [for CURRENT ANTHROPOLOGY] are excellent indeed. Notwithstanding, the contents of the first issues will provoke the best comments, and will, in the long run, incite approval or disagreement with the organization and presentation of these contents. In particular the first volumes will establish if CA fits the needs of all of us on such a world scale and in such a variety of scientific subdisciplines.

LAURO JOSÉ ZAVALA

Excellent first issue. Of value not only to specialists but to those of us who teach introductory courses and have difficulty keeping up with the volume of literature in each of the special fields.

ERNESTINE FRIEDL

The first number of CA fully lives up to your announced purposes. Each of the three major articles is a contribution of the first importance and carries conviction as a competent survey of a field close to the center of contemporary anthropological concern. I myself happen to be especially interested in La Barre's "Twenty Years of Peyote Studies" and am aware that even a much more studious follower of the literature could not possibly, without this help, come to know all of even the more important contributions in this field, distributed as they are over so wide an area of specialized interest.

While for immediate practical purposes the survey type of article will probably appeal to most anthropolo-

gists in many lands (and it is not difficult to think of likely subjects), I hope that the editors will not shy away from substantive contributions of theory. The professional anthropological journals are so weak in that respect that some of the most original general contributions of that sort have in recent years appeared in such non-specialized journals as *Science*, journals devoted primarily to other disciplines, and even, in one or two cases, journals addressed to the general reader.

BRUNO LASKER

The Leakey note on *Zinjanthropus* was much appreciated. Beginning students are forever questioning about such, which they read about in news journals. Now, how about a similar note on *Oreopithecus*?

ROBERT C. EULER

... Thanks for the realization of the splendid idea of CURRENT ANTHROPOLOGY. I think we have all badly needed a journal that brings us into closer cooperation on an international level. A few comments: (1) Although it is very useful to have exhaustive summaries of important subjects, anyone wishing to go deeper into the specific matter would have to turn to the literature anyway. Therefore I should prefer shorter, purely informative articles with a good bibliography (see Heydreich's pre-war *Ethnographischer Anzeiger*, or medical journals like the *Leprosy Journal*, containing a short summary of everything that has appeared on a particular subject). (2) As sociates in CA should send their publications and offprints to the Editor, to be sent to other Associates interested in that particular field, on the condition that the receivers review the publications. A number of reviewers should co-operate on a particular field and discuss the more important publications, in CA. (3) Associates might announce in CA the topics on which they are working or intend to work; this would prevent duplicate work and get Associates with mutual interests into touch with each other. These and other announcements should be classified regionally and topically, e.g., according to the classification of the Human Relations Area

Files. (4) CA should make known vacancies and other offers (paid or unpaid) for collaboration in particular fields of anthropological research. I could imagine, e.g., that anthropologists are wanted to join in field work started by other disciplines, international or national organizations, etc. (5) Special regard should be paid to making reviews, suggestions, discussion, etc., really appeal to Associates in other countries, and to keeping CA as international as possible, avoiding all "Americanisms" (e.g., "do we backtrack on this"). If possible, a number of assistant editors from each continent should help to advise on seemingly trivial, yet psychologically important, matters like style and the "make-up" of the journal.

RÜDIGER SCHOTT

I would suggest that if articles are to be included as a basis for discussion, they should not be simply summaries of work done on their subject but should advance general propositions of some kind.

LUCY MAIR

[CURRENT ANTHROPOLOGY] seems a valuable idea. Topicality [is] important—so authors should be urged to write before they feel 100% safe on their reports. (They never are, really, anyway.)

JACQUETTA PRIESTLEY (HAWKES)

Review articles are all-important, but they should not be too esoteric; they should not require detailed knowledge of the subject being reviewed. Three per issue would be better than two, so that a wider coverage of the total field of Anthropology might be made in, say, a five-year period.

E. MOTT DAVIS

Feel strongly that what is most needed are current bibliographies and abstracts, rather than symposia, review and programmatic articles, summaries.

WILLIAM C. STURTEVANT

I hope that CURRENT ANTHROPOLOGY will standardize anthropological terms.

CHIKASATO OGYU

I wish there were some way to arouse a public discussion on the need for training in anthropogeography. I teach a semester's course in this, and require it of all majors. I consider it fundamental and indispensable. Yet—just mention "anthropogeography" to an anthropologist, and the response to the stimulus is a murmuring of the name of Ratzel and possibly of Semple; prod a bit further, and you will get Sauer and Russell & Kniffen—all dishearteningly beside the point. I wish, in other words, that there were some print-forum where I might submit an outline syllabus for criticism and discussion. My central

thesis right here is, that culturology through the eyes of a geographer is not at all geography seen through the eyes of an anthropologist. Wouldn't you think that, what with all the area study being done, and projects of applied anthropology going forward all over the world, the subfield of anthropogeography would be a very lively one? Why, then, is it dead? Why do we have no monographs, no articles, no textbooks, and apparently no courses in the subject?

EARL W. COUNT

Lack of up-to-date information about work being done in . . . parts of Africa, particularly in the later periods, is at present frustrating. There is such a long gap between the work and publication, if the latter takes place at all.

KEITH RADCLIFFE ROBINSON

I write all my theses and observations in Akan Twi, the principal language of the Ghanians. I feel that up to date the field covered in my research and researches carried on by other interested people are inadequate because of lack of funds. There is a rich area of anthropological interest in Ghana which must needs be investigated before too late.

BENNETT SMITH AKUFFO

Particularly in the area of ancient agricultural techniques, the insufficient international organization of work forms a considerable obstacle to the progress of researches.

CHARLES PARAIN

See the American Geological Institute *Geo-times* for ideas from a sister science.

JACK T. HUGHES

Review Articles

How about including an occasional essay, a badly neglected literary form, in *CURRENT ANTHROPOLOGY*, on the aims, attitudes, objectives, preconceptions, and what-have-you of the anthropologist himself?

DONALD J. LEHMER

A review article in theory and data on social and cultural evolution would serve as a most welcome sign-post for the discipline. What is needed is a full-blown survey of large, medium, and small-scaled studies of change in terms of time and space, in order to establish where we have come to so far in our understanding of the regularities underlying human history. This would give us a common basis for developing concepts, and theoretical models designed to cope with the immense quantity of data on social and cultural change, and could serve as a unifying focus for the various branches of anthropological enquiry.

RONALD COHEN

It would be valuable to have a full discussion of the Kroeber-Parsons statement on "The Concepts of Culture and of Social System" (*American Sociological Review* [Oct., 1958] 23:582-83).

HARRY ALPERT

Modern methods in relation to grave and cemetery excavations.

AEMILIAN J. KLOIBER

Have just finished a short review of Insects as Human Food.

SIMON BODENHEIMER

Social and Cultural Evolution; The Study of Social Status.

IRVING GOLDMAN

Wish to endorse Fürer-Haimendorf's suggestion that constructive attention be given to "understudied" areas. Would also like to suggest a series of reviews of the "state of anthropology" (in teaching, research, etc.) in non-English-speaking areas.

JOHN GULICK

Review of books or articles about anthropology which have appeared in Colombia.

SERGIO ELIAS ORTIZ

Research in Yugoslav and Balkan ethnology.

MILENKO S. FILIPOVIĆ

Any matter dealing with the analysis or synthesized use of Communications in Rural Development within India since 1927.

EVELYN WOOD

Anthropology and Hindu Law.

WILLIAM MCCORMACK

In two years time, a review of books on the caste system in East and Southeast Asia.

WILLIAM H. NEWELL

Present state of knowledge regarding the origins and spread of the Bantu peoples of Africa.

HUBERT M. CHITTICK

The Present Status of the Bushman and Hottentot Problems. Fossil Man in Africa.

PHILLIP V. TOBIAS

East and Central African Ethnohistory; The Archaeology of Oral Traditions.

MERRICK POSNANSKY

Current research in British Central Africa.

J. CLYDE MITCHELL

Survey of linguistic studies published by the Royal Museum of the Belgian Congo, with appraisal and discussion of methods.

EDGAR G. C. POLOMÉ

Description of physical characters of some populations of Belgian Congo: Baloba, Babira. Comparative study of

the Babira living in the rain forest and the Babira living in savannah.

JACQUES SPORCQ

Articles dealing with social change or acculturation; or on Scandinavian or other Northern European folklore.

KNUT G. PIPPING

Articles about "The Origins of Folk Art," "New System in Ethnomusical Research," and "Symbolic Meaning of Colours in Folk-Poetry."

LAZSLO LAJTHA

News and Reference Materials

Suggest a regular column on New Discoveries and Dates, *not* necessarily evaluated, but drawing early attention to their existence: i.e., for important, or seemingly important, finds whose announcement may be obscure or delayed. Examples: Kwangtung Upper Pleistocene skull (see *Vertebrate Asiatica*, Vol. 3). Also glottochronological results, and striking C14 dates reported.

W. W. HOWELLS

Will it be possible to obtain periodic reports of Russian and Chinese research in northeast Asia? Perhaps as summaries in *CURRENT ANTHROPOLOGY*?

EUGENE I. KNEZ

Suggest systematized publication of abstracts by topics or problem areas, with emphasis on abstracts of pertinent publications in related disciplines.

T. N. CAMPBELL

Brief excavation reports (100 words) from regional areas perhaps of value, if selected, since normal reports take too long to appear. The Journal could try an offprint scheme, perhaps on the pattern of the Council for British Archaeology, so that Associates and Institutes could build up specialized libraries at not an undue expense and save the necessity for belonging to far too many bodies.

MERRICK POSNANSKY

News items of archaeological discoveries in Nigeria.

FRANK WILLETT

Regular news on all the ethnographical studies on Central Africa.

VAAST VAN BULCK

Information about recent field activities in Asia and other [little reported] areas would be useful.

KAWAKITA JIRO

I suggest that *CURRENT ANTHROPOLOGY* should annually carry short reports from all principal institutions.

LAURITS BØDKER

(Continued on page 260)

European and Northwest African Middle Pleistocene Hominids¹

by F. Clark Howell

THE SPARSE REPRESENTATION of human skeletal remains from the Middle Pleistocene has always been one of the greatest gaps in human-paleontological knowledge. At first, Southeastern Asia was unique in having provided remains from the Trinil beds in Java, but the significance of this poorly preserved skull-cap was confirmed and greatly amplified by subsequent discoveries (Von Koenigswald 1940) of better preserved specimens at other localities of similar age, as well as in the still older Djertis beds. Still truly unique in all the world is the somewhat younger occupation site of Locality 1 Choukoutien, with its extraordinarily abundant, probably cannibalized, human remains in association with hearths, stone implements (Choukoutienian chopper/chopping-tool complex), and remains of slaughtered animals.

For many years, the only such find from the West was the enigmatic human mandible from the Grafenrain gravel pit at Mauer in the Rhineland. Then, within a few years in the mid-thirties, three additional specimens came to light in western Europe (Steinheim), Britain (Swanscombe), and northwest Africa (Rabat, Morocco). In the last several years, further Middle Pleistocene human remains were found in northwest Africa, both in Algeria (Ternifine) and in Morocco (Sidi Abderrahman). All these discoveries (Fig. 1) have excellent paleontological associations, and, in three cases (Swanscombe, Ternifine, Sidi Abderrahman), there are associated stone implements (Acheulean of various stages). However, no occupation site is yet

known from the Middle Pleistocene of Europe or Africa with *in situ* human skeletal remains, stone implements, and the bones of slaughtered animals.

These human skeletal remains, taken in conjunction with those from the Middle Pleistocene of eastern and southern Asia, have an important bearing on interpretations of the course of human evolution. The significance of these discoveries has been obscured by the preoccupation of some human paleontologists with other human remains either *suspected* to be of Pleistocene antiquity or questionable due to an extraordinary complex of morphological features (the famous hoax of Piltdown). Largely as a consequence of this, there have grown up two main interpretations of man's phylogeny in the Pleistocene, one depending on the possible importance of the suspicious "fossils," and the other depending only on the scanty, but well-dated, human fossils enumerated above. The former interpretation recognizes an early, at least earlier, Middle Pleistocene separation of a morphologically modern (*sapiens*) lineage. The latter postulates progressive transformation of primitive and variable Middle Pleistocene human populations into diverse "Neanderthal" and related, geographically distinctive, groups, as well as into incipiently *sapiens* peoples. The purpose of this paper is to discuss the significance of the Middle Pleistocene human remains from Europe and North Africa for the resolution of this basic problem in the study of human phylogeny.

COMPARATIVE STRATIGRAPHY AND ASSOCIATIONS

THAMES RIVER: SWANSCOMBE

The Swanscombe human remains were recovered from gravel deposits exposed in the Barnfield pit, between Dartford and Gravesend, on the south bank of the lower Thames River valley. Marston (1937) discovered a complete occipital in June, 1935, and a left parietal in March, 1936. Twenty years later Wymer recovered the right parietal of the same individual. The three fragments occurred in the same seam of sandy

F. CLARK HOWELL is Associate Professor of Anthropology, Department of Anthropology, University of Chicago (Chicago, Illinois, U.S.A.). He was born in 1925, and educated at the University of Chicago (Ph.D., 1953).

HOWELL has undertaken field and other studies on early man in Europe (1953, 1956) and in Africa (1954, 1957-58, 1959), and made a recent brief visit to Israel (1959). He has published various papers on human paleontology, especially as regards the Neanderthal problem, and on early man and the Pleistocene in general.

Prior to submitting the present paper to CURRENT ANTHROPOLOGY, HOWELL sent it, for comment and criticism, to three colleagues, of whom W. W. Howells and Kenneth P. Oakley responded. The response was primarily commendatory, and except for HOWELL's addition of some paragraphs along lines recommended by Oakley, the paper stands as first written.

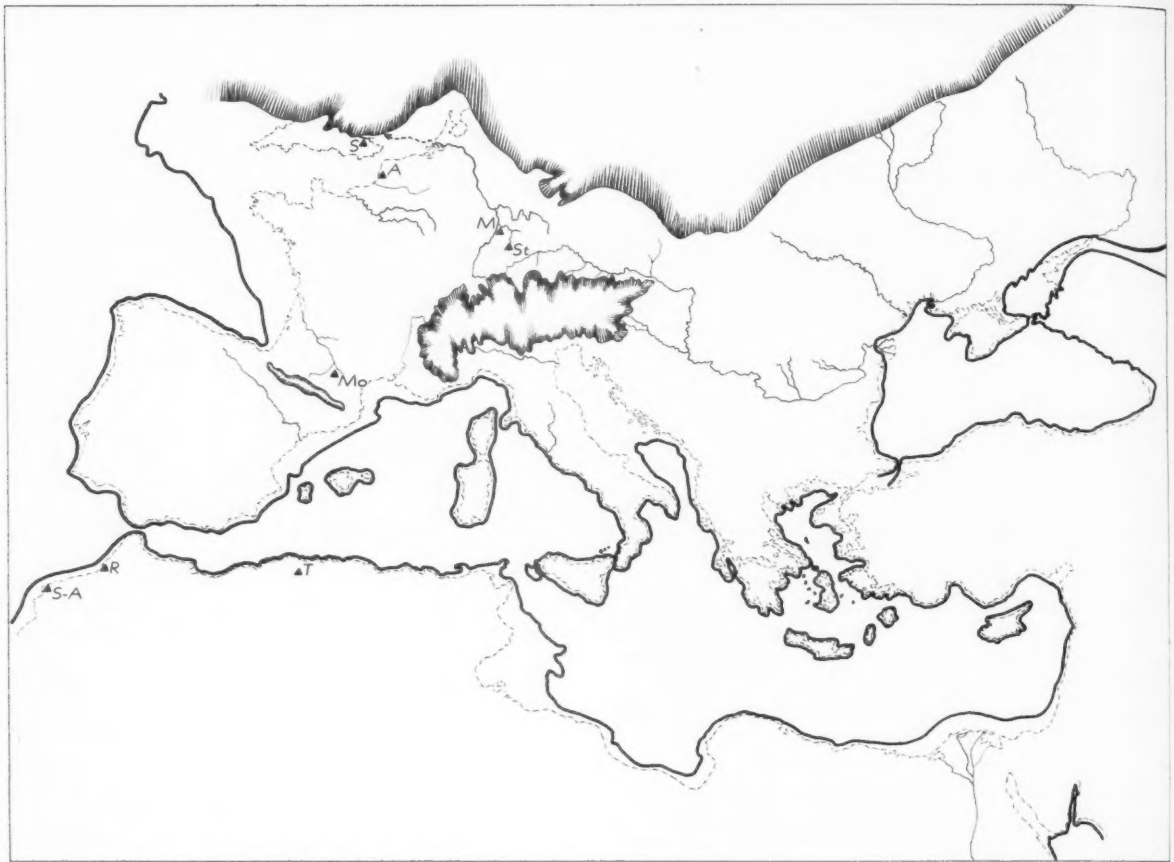


FIG. 1. Outline map of Europe and the circum-Mediterranean regions. The continental outlines are those of the earlier Middle Pleistocene during the extensive Romanian regression, correlative with the first major continental glaciation (Elster) and the Mindel glaciation of the Alps. Key to abbreviations: S = Swanscombe; A = Abbeville; M = Mauer; St = Steinheim; S-A = Sidi Abderrahman; R = Rabat; T = Ternifine.

gravel, "the position of the three fragments forming a triangle with sides 51, 49 and 24 ft." apart (Wymer 1955). These gravels and sands represent fluvial accumulations within the High (100 feet) or Boyn Hill Terrace, which extends as a nearly level feature for some fifty miles (Fig. 2) (Smith and Dewey 1913; Dewey 1932; Wooldridge and Linton 1955). At the time of the aggradation, the river flowed in a wide, meandering course, successively cutting, filling, and then abandoning channels. The Barnfield pit exposes some thirty-five to forty feet of gravels, sands, and loams that filled in one such ancient channel, its base at seventy-five feet, cut into the local bedrock (Thanet Sand and Chalk) (Fig. 3).

The human remains occurred in an obliquely-lying gravel seam at the base of the Upper Middle Gravel, some sixteen to twenty feet of current-bedded reddish-yellow sands (below) passing upward into pale yellow cross-bedded sands with some silty layers. Above these "gravels," a thin wedge of soliflucted rubble is interposed at the base of the three to four feet of thick sandy Upper Loam. These deposits fill a small channel cut during a minor erosional phase into the underlying Lower Middle Gravel (and sands), the Lower Loam, and in part the Lower Gravel. The skull fragments appear to have reached the base of this channel shortly after it was cut and still dry, quite clearly prior to the deposition by floodwaters of the successive seams of Upper Middle Gravels and sands. The stone tools associated with the human remains, including numerous

hand axes, flake tools, and many waste flakes but rarer cores, constitute a Middle Acheulean industry (Acheulean III-IV of the Somme classification of Breuil) (Smith and Dewey 1913; Swanscombe Committee 1938). This same industry is present also in the underlying Lower Middle Gravels as well as on the surface of the Upper Loam. However, Wymer's (1958) recent work at Swanscombe indicates that ovates and cleaver-forms of bifaces, as well as tortoise cores, are lacking in the skull-layer, whereas the former are present on a land surface of the Upper Loam. He has also found traces of fire, including reddened and crackled flints and small pieces of charcoal, in the skull-layer.

It has been suggested that the Middle Gravels and Upper Loam constitute a recognizably distinct depositional stage, the Middle Barnfield or Late Boyn Hill stage, separated by an erosional interval (represented in certain localities) from the Lower Gravel and Lower Loam, the Lower Barnfield or Early Boyn Hill stage of King and Oakley (1936). Judging from the molluscan faunas, the Thames and Rhine rivers were separate during the earlier stage, whereas, in the Late Boyn Hill

stage, species of freshwater Rhenish mollusca began to penetrate into the Thames River valley (cf. Oakley 1952). The Lower Loam, a silty deposit laid down in reed-filled swamp conditions, was probably weathered during that interval. A very rich Clactonian industry (Clactonian II of the classification of Breuil 1932), comprising many flake tools, cores, and core choppers (but no hand axes), is present in the Lower Gravel (Smith and Dewey 1914; Chandler 1930, 1931, 1932, 1935). The mammalian fauna from these latter gravels is especially rich, with two forms of elephant (*Elephas antiquus*, *El. trogontherii*), broad-nosed rhinoceros (*Rhinoceros merckii*), hippopotamus (*Hippopotamus amphibius*), wild boar (*Sus scrofa*), deer (*Cervus elaphus*, *C. browni*), wild ox (*Bos primigenius*), wild forest horse (*Equus caballus*), giant beaver (*Trogontherium cuvieri*), and various small rodents and voles. The faunal assemblage from the series of Middle Gravels is similar, but lacks giant beaver, oxen, and wild boar, and includes two extinct fallow deer (*Dama clactoniana*, *Megaceros* sp.),

one a giant form; also, in a silty layer in the Upper Middle Gravels, small mammals occur, including extinct voles (*Microtus agrestis-arvalis*, *M. ratticepoides*) and a lemming (*Lemmus* sp.) (Schreuder 1950). The composition of the fauna in both gravel series is typically interglacial (Swanscombe Committee 1938; Oakley 1952, 1957b). The fluorine content of the human skull fragments and of the animal remains is similar, confirming that the Swanscombe cranium is of the same age as its containing deposit (Oakley 1951, 1953).

Several distinct lines of evidence permit quite accurate relative dating of these deposits within the framework of the Pleistocene succession of Britain (King and Oakley 1936; Oakley 1952, 1957b). It is clear that one,

FIG. 2. Terraces of the lower Thames Valley and the location of Swanscombe (redrawn after Wooldridge and Linton 1955).

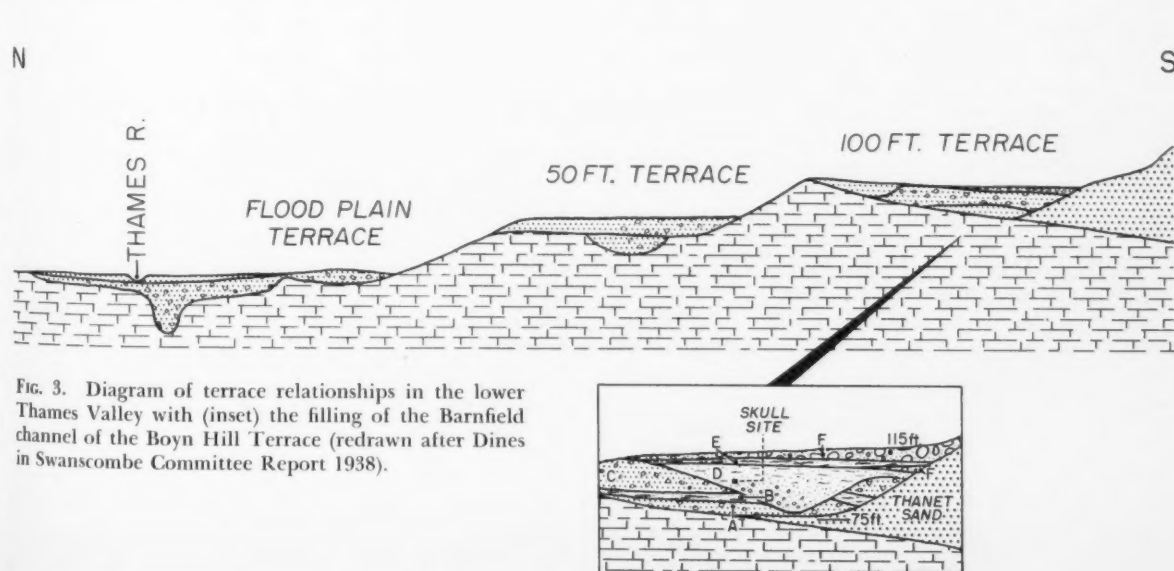
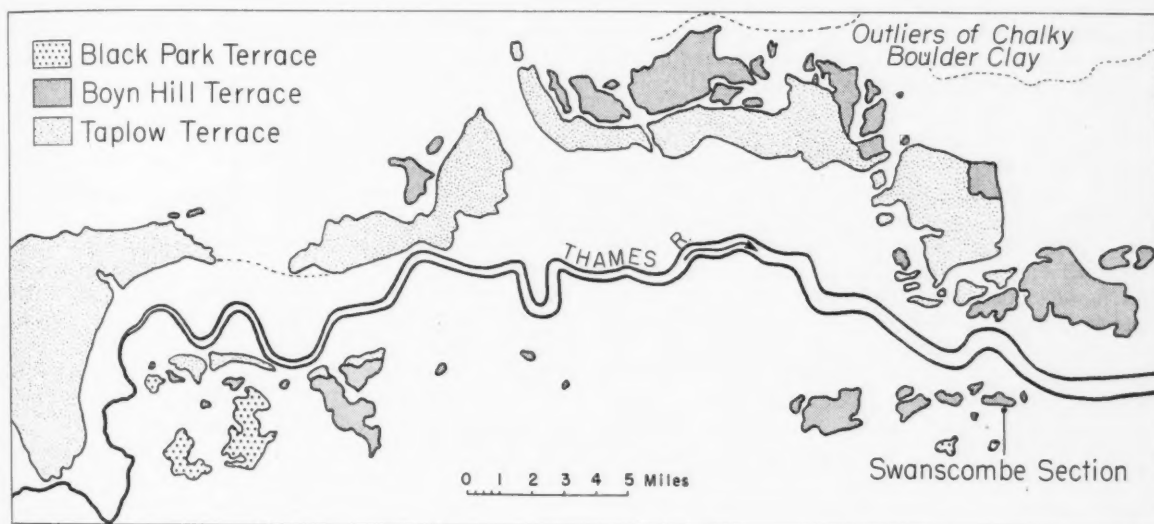


FIG. 3. Diagram of terrace relationships in the lower Thames Valley with (inset) the filling of the Barnfield channel of the Boyn Hill Terrace (redrawn after Dines in Swanscombe Committee Report 1938).

and more likely several, glacial advances preceded the aggradation of the deposits that constitute the Boyn Hill Terrace, since: (1) within the gravels, far-traveled glacial erratics are found, attributed by Baden-Powell (1951) to the Lowestoft (Lower Chalky Boulder Clay) Glaciation; (2) the Thames River flowed at the time in its present terraced valley, previously having been diverted southward from more northeasterly courses by glacial advance(s) (Wooldridge 1938, 1957; Wooldridge and Linton 1955); (3) such gravels overlies glacial boulder clay at certain other exposures (Hornchurch); and (4) the great thickness of the Swanscombe gravels indicates a considerable rise in sea level during their aggradation, a rise, in fact, of approximately 107 feet, corresponding with the extent of the Tyrrhenian I marine transgression of the Mediterranean. The initial point is of particular importance, since the southeasterly-directed Lowestoft glacial advance preceded the southerly-directed Gipping glacial advance and was separated from it by a major interglacial stage (Baden-Powell 1948; West and Donner 1956). This interglacial stage, termed the Hoxnian (West 1955), equates with the Needian of the marine succession of the Netherlands, and with other continental localities of Great Interglacial age on pollen-analytical grounds (West 1956). The Gipping Glaciation is equivalent to the continental Saale Glaciation; the preceding Hoxnian interglacial is the equivalent of the Great Interglacial, that is, the Mindel-Riss stage of the Alpine succession. Thus, on geological grounds the deposits that constitute the Boyn Hill Terrace are of Great Interglacial age, and this is further substantiated by the faunal and stone tool assemblages.

The exact position within the admittedly long Great Interglacial is a more difficult matter. Oakley (1952; Oakley and Leakey 1938) attempted to show that the later Barnfield deposits (Late Boyn Hill stage) represented the latter half of this interglacial, probably equating with the earlier part of the marine Drenthian of the Netherlands. It is now clear that the Middle Acheulean assemblages from the Barnfield pit at Swanscombe, and the silted-up Hoxne lake basin, belong to the same industrial stage (West and McBurney 1954). If the Hoxne pollen sequence (West 1956) is utilized as a measure of the climate during this interglacial, such an Acheulean industry was practiced at the onset of a deterioration of climate (end of Early Temperate stage 2) marked by deforestation (high nontree pollen; decline in elm, oak, and hazel; increase in pine and birch), which followed on a long phase of mixed-oak forest, presumably representing the interglacial maximum. This same shift in climate is probably reflected in the solifluction wedge between the (Upper) Middle Gravels and Upper Loam in the Barnfield pit.

The type site of the Clactonian, Clacton-on-Sea (Essex), representing an old channel filled with two lower freshwater beds (the lowermost yielding Clactonian implements in great quantity, a yew-wood spearpoint, as well as fauna and flora) overlain by estuarine beds (Warren 1923, 1924, 1932, 1951, 1955), was generally assumed to correspond with the interval represented in the weathering of the Swanscombe Lower Loam (King and Oakley 1936; Oakley and Leakey 1938; Oakley 1952; Warren 1955). The recently published pollen dia-

gram from Clacton (Pike and Godwin 1953) indicates a mixed-oak forest (oak, elm, and linden, in decreasing order of abundance) extending from the upper part of the freshwater series well into the estuarine series, where it is replaced by a coniferous forest phase particularly high in silver fir. West (1956: 340) has pointed out that "this forest development exactly parallels that of Stage III (= Late Temperate) at Hoxne, with the component trees the same." However, the basal freshwater beds are not represented in the diagram, and it is presumed that these would fall into an earlier Early Temperate stage, very likely even older than the Swanscombe Middle Gravel series. Thus, this evidence does not necessarily contradict the former relative dating of the Clactonian from the Clacton channel to a phase earlier than the Late Boyn Hill stage. These different types of stone industries do not necessarily imply that morphologically distinct peoples were responsible for the Acheulean and the Clactonian. Oakley (1952: 291) has suggested that it is very probable that "the hand-axe people . . . were mainly adapted to life in open grassland, rather than to wooded country," whereas the Clactonian industry "represents the facies of Lower Palaeolithic culture which was more related to forest life." While this is not yet proved, and may very well be extremely difficult ever to prove, it is evident that man's tools, his way of life, and the environments in which he lived are all inextricably linked, and that this is the most productive manner in which to approach the problem.

Table 1 illustrates the specific succession under discussion, and relates it to the general Pleistocene sequence of Britain (King 1955; West 1958) and also that of the Netherlands (Van der Vlerk 1950, 1953; Van der Vlerk and Florschütz 1953; Zagwijn 1957). The well-defined interglacial stages are used as marker horizons (cf. Van der Vlerk 1955, 1956; West 1955). No attempt has been made to offer a correlation with the still inadequately known *earlier glaciations* of the Alpine region. The complex nature of the post-Villafranchian but pre-Great Interglacial stratigraphy is especially to be noted (cf. Boswell 1931, 1936; King 1955). Prior to the well-defined and distinctive Hoxnian (= Needian) interglacial stage, there were at least two warmer phases, the earlier represented by the well-known Cromer Forest Bed (Norfolk) (Sainty 1929; Boswell 1958), and the later by the fossiliferous marine sands of the Corton Beds (Baden-Powell and Moir 1942); the latter might represent only an interstadial, although the series cover an interval of erosion, weathering, and marine transgression. The industry of the old Caversham channel, containing a high proportion of Abbevillian and early Acheulean types, was tentatively referred to this stage (Treacher *et al.* 1948), but Wooldridge (1957) agreed that it might be slightly later, and Oakley (in West and Donner 1956: discussion) now considers that it is unquestionably *no earlier* than Great Interglacial. The Forest Bed series is distinct from the Hoxnian, both on faunal (Newton 1882; Osborn 1922; Azzaroli 1951)² and floral (Reid 1890; Reid and Reid 1908; Thomson in Woldstedt 1949; Rein 1955) grounds, and is generally agreed to represent a full "interglacial stage." However, the Forest Bed is clearly post-Villafranchian (post-Tegelen), and also underlies the

earliest true glacial morainic deposits in Britain (Boswell 1958; Harmer 1902). These complexities have an important bearing on the age of the Mauer sands and gravels, as will become evident below.

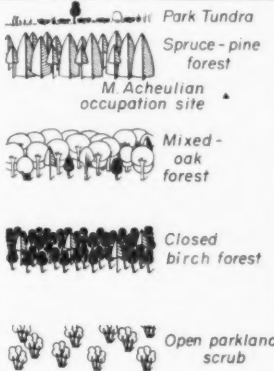
NECKAR RIVER

MAUER

The Mauer (or Heidelberg) mandible was recovered in 1907 from the basal sands and gravels complex of the Grafenrain pit, on the Elsenz River just north of the village of Mauer. Mauer is situated some five kilometers south of the Neckar River town of Neckargemünd, and is about ten kilometers southeast of Heidelberg. During the earlier and Middle Pleistocene the Neckar River followed a somewhat different, more meandering,

course than it does at present, and a number of such old, now abandoned, meanders between Stuttgart and the junction of the Neckar with the Rhine River west of Heidelberg (Fig. 4) are well known and have been mapped (Deecke 1926; Wilser 1937). Upon reaching the site of the present town of Neckargemünd, the ancient Neckar made a sharp bend to the left and flowed southward through the now dry Wiesenbach Valley for a distance of some seven kilometers (Fig. 4, inset); the

TABLE 1. Provisional correlation of Middle Pleistocene stratigraphy in the lower Thames Valley and in East Anglia, with correlative stages in the Netherlands marine succession.

NETHERLANDS		EAST ANGLIA	THAMES VALLEY
DRENTHIAN		<p>GIPPING GLACIAL ADVANCE (=Upper Chalky Boulder Clay)</p>	<p>MAIN COOMBE ROCK (=Catuvellaunian of Arkell)</p>
NEEDIAN	HOXNIAN		<p>BOYN HILL TERRACE [M. Acheulian]</p> <p>Upper Loam</p> <p>Solifluction</p> <p>Middle Gravel { Upper (Homo) Channel-cutting Lower</p> <p>land surface — Clacton Channel</p> <p>Lower Loam</p> <p>Lower Gravel</p>
TAXANDRIAN		<p>LOWESTOFT GLACIAL ADVANCE (=Lower Chalky Boulder Clay)</p> <p>CORTON BEDS [early Clactonian]</p> <p>CROMER GLACIAL ADVANCE (=North Sea Drift)</p>	<p>[Abbeville-Acheulian] (Winter Hill Terrace; Caversham Channel)</p> <p>GREAT EASTERN GLACIATION (=Essex Lower Chalky Boulder Clay-Hornchurch)</p> <p>→ further southward diversion of Thames R.</p> <p>GRAVEL TRAINS</p> <p>→ southward diversion of Thames R.</p> <p>CHILTERN GLACIATION (=Berroccian of Arkell)</p>
Zones of Sterksel — Budel — Woensel — Weert	CROMERIAN	<p>CROMER FOREST BED</p> <p>Upper: Freshwater, peaty.</p> <p>Middle: Estuarine</p> <p>Lower: Freshwater, peaty.</p>	

river then made a great bow to the west and returned northward, following the same course as the present northward-flowing Elsenz River (Sauer 1898, 1909; Thürach 1909; Rüger 1928*b*). To the north, the two branches of this uncommonly long, parallel-sided loop were separated by the Hollmuth horst or upland. A fairly substantial basin, particularly favorable for extensive fluvial deposition by a sluggishly-moving stream, lay in the bow of the meander at the south end of the loop. The latter coincided with the boundary of the uplifted Odenwald Buntsandstone shield and the Kraichgau depression (northern Mulden flank).

The tectonic instability of the Rhine Valley in general, and of this region in particular, is well known, and various workers (Schmitthenner 1922; Kolb 1931; Wagner 1929*a,b*, 1950; Becksmann and Richter 1939) have stressed the important role of tectonic movements in the formation of ancient meanders. This Hollmuth meander of the Neckar follows closely the course of the two, parallel north-south trending, fault zones. The Neckar River, which originally ran near its present course over the earlier-Pliocene surface (Salomon 1924), was apparently forced southward due to terminal Pliocene-basal Pleistocene uplift of the Hollmuth horst along this unstable zone (Becksmann 1950). Some

traces of the earliest fluvial accumulations within the meander are present in the so-called "Wiesenschach gravels": these lie at high levels, varying from 200 to 150 meters (a.s.l.), and at some localities are known to rest on the eroded shelly limestone bedrock (*Muschelkalk*). The Wiesenschach gravels, predominantly Buntsandstone, differ from the Mauer gravels proper in the relative absence of limestone elements (probably originally present, but removed by weathering), in the loamy nature of the gravel matrix, and in their brownish color. Becksmann (1950), in stressing the importance of these deposits, pointed out that, at two pits (Ziegler's and Schafer's) in the vicinity, there is evidence of erosion of the Wiesenschach gravels prior to subsequent burial by the overlying Mauer Sands. The uplift of the Odenwald, which must have largely ended by late Pliocene times, took place prior to the aggradation of the Wiesenschach series, and subsequent to the erosional phase that developed the Pliocene surface.

The succession exposed in the Grafenrain pit comprises (1) a lower series of fluvial deposits of the ancient Neckar River, overlain by (2) a loessic complex with intercalated weathering horizons (Fig. 5). The lower or fluvial series (Mauer Sands) consist of a basal sandstone gravel followed by a thick accumulation of

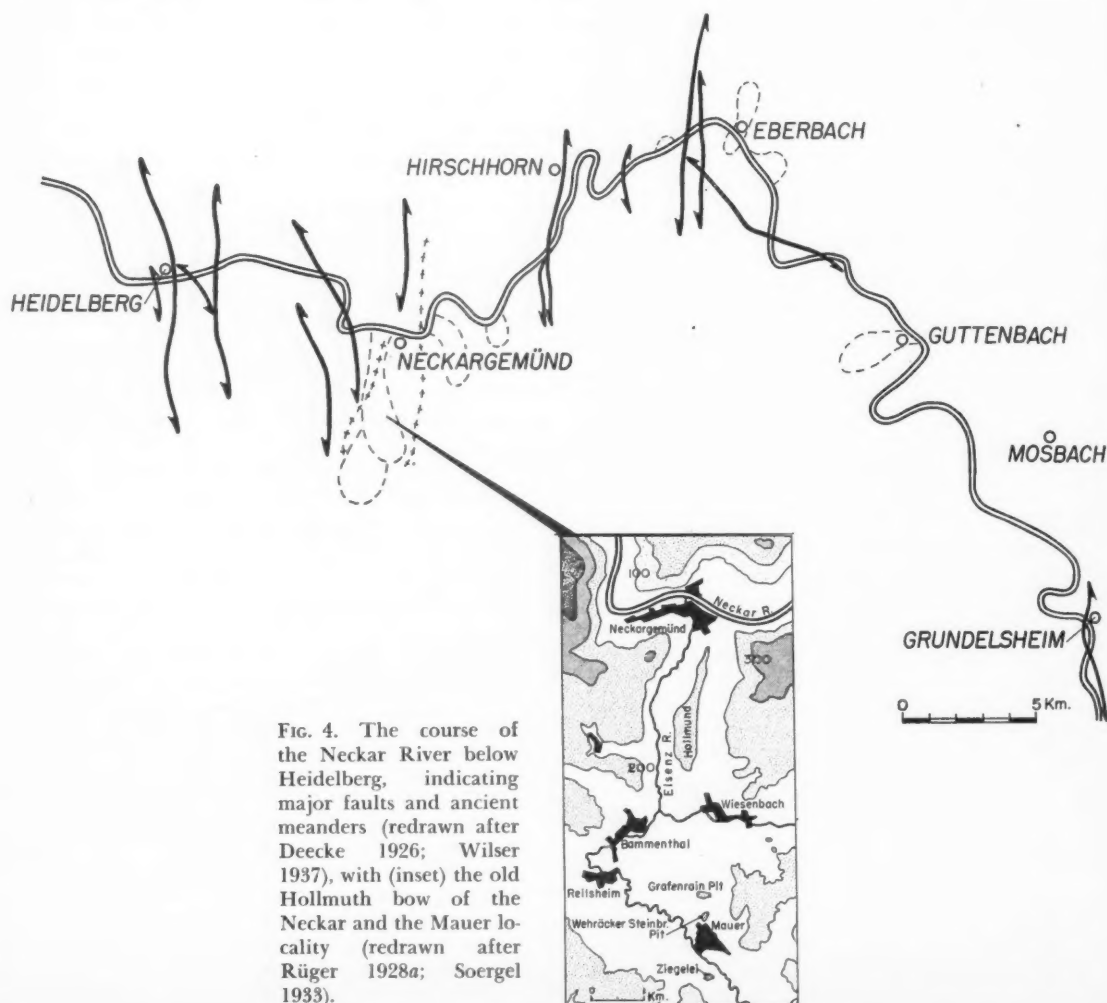


FIG. 4. The course of the Neckar River below Heidelberg, indicating major faults and ancient meanders (redrawn after Deecke 1926; Wilser 1937), with (inset) the old Hollmuth bow of the Neckar and the Mauer locality (redrawn after Rüger 1928*a*; Soergel 1933).

yellow or gray sands, within which occur thin clay lenses (*Lettenbank*). Another sandstone gravel of slight thickness caps these sands. All these sands and gravels, the latter composed largely of quartz, shelly limestone, and red sandstone (Soergel 1928, 1933), are lacking in glacial erratics, and must therefore antedate the first extensive continental glaciation, the Elster (Mindel). The human mandible was found within the Mauer Sands, at a depth of some twenty meters from the top of the pit. These sands have also yielded a particularly abundant and well-preserved mammalian fauna, including, in decreasing frequency, extremity bones, mandibles and teeth, portions of skulls, but only one complete skeleton, that of a young red deer (Rüger 1931, also 1928b). The fossils occur in a completely unrolled and fresh condition (cf. Salomon 1926), and are present discontinuously throughout the thickness (c. 5 meters) of the sands. It is clear that at the time of deposition the stream must have been relatively slow-moving and sluggish, with numerous marshy and ponded places where animals came to drink and where Mauer man probably took full advantage of opportunities for hunting. The faunal assemblage, in contrast to that from other such sites, is neither derived nor mixed, but represents a faunal unity and a good sample of local mammals of the time at which the sands were accumulated.

According to the figures first published by Soergel (1923; cf. Wurm 1912d, 1913; Freudenberg 1914), seventy per cent of the fauna is comprised of etruscan rhinoceros (*Rh. etruscus* = 20.5%) (Wurm 1912b,c), red deer (*C. elaphus* = 18%), straight-tusked elephant (*El. antiquus* = 18%) (Soergel 1912), and bison (*Bison priscus* = 14%); a further eighteen per cent is made up by moose (*Alces latifrons* = 5.5%), roe deer (*C. capreolus* = 6.5%), and horse (*Eq. mosbachensis*). More rare, each constituting 2% to 3% of the assemblage, are remains of a primitive bear (*U. arvernensis* = *U. stehlini* of Heller 1949), both primitive (*T. cuvieri*) and modern (*Castor fiber*) beaver, and wild boar (*S. scrofa*). The list is completed by rarer specimens of various felids (*Felis leo*, *F. catus*, *F. pardus*, *F. issidorensis*) (Wurm 1912a; Rüger 1928a; Voelcker 1930), a sabretooth tiger (*Homotherium crenatidens* = *Machairodus latidens*) (Rüger 1929; Voelcker 1929), a primitive wolf (*Canis mosbachensis*), primitive hyena (*Hyaena arvernensis*), another bear (*U. arctos deningeri*), and hippopotamus (*H. amphibius*) (Voelcker 1931), and a microfauna including voles (*Arvicola greeni*, *A. mosbachensis*, *Dolomys episcopalis*) and moles (*Talpa gracilis*, *T. praeglacialis*) (Heller 1934, 1939). This assemblage, as well as the invertebrate fauna (Geyer 1910, 1913), indicates a woodland biotope, probably a deciduous mixed-oak forest (remains of oak do occur in the Mauer Sands), which is widely agreed to be of interglacial age.

The Mauer fauna is post-Villafranchian, and thus constitutes the oldest truly "interglacial" assemblage in continental Europe. On comparative paleontological grounds, its relative age can be fairly well determined, since it is bracketed between an older and a younger steppe fauna (Adam 1952, 1953). The fauna from the Mauer Sands is recognizably younger than the warm-steppe fauna represented by earlier (Stage I) assemblages, characterized by *El. meridionalis-trogontherii*,

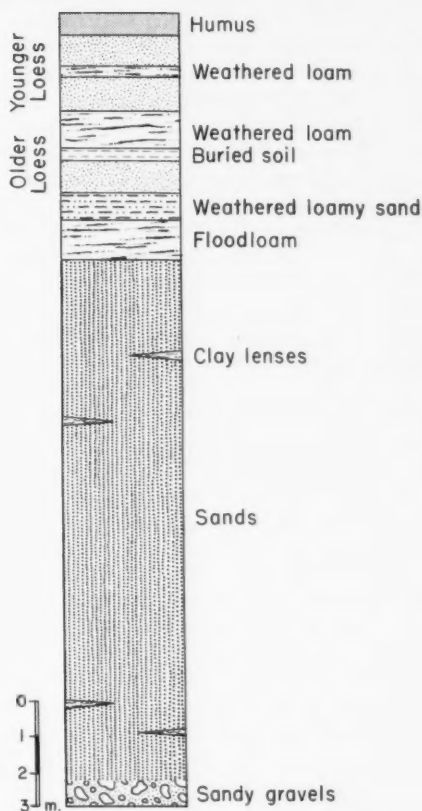


FIG. 5. Stratigraphic succession exposed in the Grafenrain pit at Mauer (redrawn after Müller-Beck 1957).

from the not far distant sites of Mosbach (near Mainz, Rheinhessen) and Jockgrim i.d. Pfalz.³

The Mauer fauna is older than the later (Stage II) fauna from Mosbach. It is also older than the fauna from the high-level (50–70 meters) gravels at Süssenborn, situated about five kilometers east of Weimar, in an old meander of the Ilm River. Both these sites are older than the main faunal assemblage(s) from Steinheim (see below).⁴

There is a good faunal sequence here, from the apparently fully interglacial Mauer assemblage, through to the semi-periglacial steppe assemblage of Süssenborn, the main Mosbach fauna being more or less intermediate. The Süssenborn fauna is widely regarded as of Elster (= Mindel 2 of some authors) glacial age (Soergel 1923, 1924, 1939a; Adam 1952, 1953; Zeuner 1945). The full advance of this glaciation extended as far south as Thuringia and the Mittelgebirge (Woldstedt 1950, 1954–8). The Mauer Sands were accumulated in the bow of the Hollmuth meander during an earlier interglacial phase, but the difficult question is to determine which phase. Frequently, since they were known to be "pre-Mindel," the Mauer Sands and their contained fauna have been referred to the so-called "First Interglacial," the Günz-Mindel or Antepenultimate Interglacial of Zeuner; this view was held by Soergel (1933), although he (1928) had earlier held the view that an interstadial

age within the Mindel Glaciation was more probable (accepted by Zeuner 1937, 1945, 1952). Since there is no straightforward way of linking these deposits with the Alpine Pleistocene succession, and since the "First Interglacial" of the Alps has been equated by some authors (cf. Movius 1949b) with the Cromerian stage, it is simpler to avoid such an attempt at correlation.

In terms of the sequence of interglacial stages discussed earlier, the problem might be best framed as follows: Is the Mauer fauna, which is manifestly post-Villafranchian (i.e., specifically post-Val d'Arno, post-Tegelen, etc.) and pre-Great Interglacial, of Cromerian (Bilshausen of northern Germany) age or of still later interglacial/interstadial age?

The fauna from the freshwater and estuarine horizons of the Cromer Forest Bed, studied in the last century by Newton (1882; summary in Osborn 1922, and in Zeuner 1937), is clearly mixed and derived from several sources (Azzaroli 1951; cf. Zeuner 1945). Nevertheless, even when allowance has been made for such mixture, and considering that the North Sea Drift that overlies the Forest Bed series represents a pre-Elster glaciation which is not certainly known in the continental succession, the Mauer fauna is post-Cromerian (Table 2). This is evident from the composition of the bulk of the fauna and is clear also from Heller's (1936, 1939) study of the rodent remains (replacement of *Mimomys* by *Arvicola* at Mauer). It would appear most likely that the Mauer Sands were accumulated during a warmer interval within the marine Taxandrian, a period of extended duration and with a still poorly known series of climatic oscillations. It is altogether likely that this interval corresponds with the Corton Beds, which may be fully interglacial and not merely interstadial (although these terms have limited usefulness at this early time level). As shown before, this was a warmer transgressive phase between the Norwich Glacial and the Lowestoft Glacial advances in eastern Britain. This interpretation is in full agreement with all the available evidence, and avoids the uncontrollable correlation with the Alpine glacial/interglacial stages. If it could be shown that the Mindel does indeed correspond (broadly) with the Taxandrian, then the Mauer Sands and their fauna would correspond to an interglacial/interstadial amelioration within this glacial stage.

Overlying the Mauer Sands is a sandy and calcareous flood-loam succeeded by another thick (2.5 meters) brownish loess-like loam, the upper part of which was consequently weathered and denuded. Soergel (1933) stressed the hiatus above this flood-loam, and concluded that erosion was followed by weathering, a considerable lapse of time being involved. However, as Zeuner (1945) has suggested, it is equally likely that denudation and weathering took place simultaneously.

Above these fluvial deposits are a succession of loesses and weathering horizons. These were regarded by Soergel (1928) as representative of the Older (Penultimate Glaciation = Saale) and Younger (Last Glaciation = Weichsel) loesses. They are separated from the lower fluvial deposits by a discordance, above which are reddish Neckar sands about one meter thick and showing signs of sludging (solifluction). The so-called "Older Loesses" are three-fold, with a major interval of weathering between the basal and middle

elements of the complex. Soergel (1928, 1933, 1939a) concluded, and most workers agree, that this lowermost Older Loess is of Elster age, and was weathered during the Great Interglacial. The overlying, double Older Loess, split by a period of considerable weathering and erosion, undoubtedly constitutes the well-defined Saale and Warthe phases of the Penultimate Glacial stage. These are separated from the typical (for the Rhineland) two-fold Younger Loesses of Last Glacial age by a well-developed loam at the top of the Older Loess; the latter is characteristic of the Last Interglacial throughout western and central Europe. This unique succession provides additional clear-cut geologic confirmation of the age of the Mauer Sands.

Buntsandstone pebbles and flakes, supposedly showing traces of human workmanship, have been discovered by Rust (1956a,b) in the Mauer Sands. However, neither Oakley (1957a) nor the author, who have examined all or some of these specimens, accept that they show clear proof of human tool-making activity. Similarly, a pointed fragment of horse or elk tibia, reported by Voelcker (1933a,b) as a humanly fashioned spear-point, is of questionable authenticity, just as are the pointed bone fragments from the Mosbach Sands (Schmidtgen 1929, 1931). However, the Mauer mandible is still the oldest proved trace of early man on the European continent, and indications of his stone tools should eventually be discovered, given the proper geological circumstances.⁵

STEINHEIM

The Steinheim skull came to light in July, 1933, among ancient gravels of the river Murr, a tributary of the Neckar River, exposed in the Sigris pit on the northern edge of the village of Steinheim, twenty kilometers north of Stuttgart. As in the case of the Swanscombe cranial fragments, the exact position of the skull is known, since it was left in place within the gravels by the discoverer, K. Sigris, Jr., and only subsequently removed by the late Berckhemer (1933b) of the Naturhistorisches Museum, Stuttgart. The skull was overlain by gravels (5.5 meters) and loess (1.5–2 meters), and underlain by other gravels (up to 9 meters). The specimen lay in a thin, brown, fine sandy-clay (*Letten*) horizon, intermixed with sand, which in places contained coarse pebbles; within the matrix that filled the cranial cavity were small angular limestone fragments. Immediately below the skull horizon was a light, pure sandy level, the sand being derived from weathering of the basement sandstone; immediately above it was another such light sand containing numerous pebbles. These deposits (see below) are highly fossiliferous, including snails (Geyer 1913). Only two days before the skull was discovered, an *El. antiquus* molar was found about 120 centimeters above, and a *Rh. merckii* molar was found a meter below, the skull horizon; two meters above the skull, a mammoth tusk (*El. primigenius*) was also recovered. Subsequently, at the same height above the skull as the aforementioned *El. antiquus* molar, further remains of straight-tusked elephant were found, including additional molars, six tusks, two skull fragments, and a mandible (Berckhemer 1934, 1938).

Upstream from Steinheim, the Murr River flows at a marked gradient through a narrow limestone-walled

valley that widens (up to six hundred meters) and loses gradient for several kilometers between Murr and Steinheim; below Marbach, it is again narrow before it empties into the Neckar River. Between Steinheim and Murr, where the stream gradient has reduced due to the less resistant bedrock (*Lettenkohle*), the river eroded and filled a wide, meandering valley with sands and gravels during the Middle Pleistocene (Fig. 6). The aggraded deposits are of variable thickness, up to fifteen meters, with no trace of a continuous terrace: this suggests the influence of tectonic factors in this deepest part of the valley, probably due to sinking (of the Pleidelsheim basin). Presumably, as Wagner (1934; also 1929a, 1950) has pointed out, the steeply flowing river brought down much rubble and sand from its upper course and deposited its load in this widened valley,

creating gravel accumulations, spits, sand bars, and ponded waters. Such a situation, probably not too unlike that in the earlier Middle Pleistocene bow of the Hollmuth meander at Mauer, would provide maximum opportunity for the preservation of mammalian fossils, and also afford ideal localities for encampments of early man. The animal remains appear to be largely *in situ*, bones of the skeleton often being found together (known for *Bison*, *Bos*, *Cervus*). Traces of rolling are

TABLE 2. Provisional correlation of Middle Pleistocene stratigraphy in the Neckar Valley and the glacial sequence of northern Germany, with correlative stages in the Netherlands marine succession.

NETHERLANDS		NORTH GERMANY	NECKAR and RHINE VALLEY SITES
DRENTHIAN		WARTHE GLACIAL ADVANCE	M I E <i>El. primigenius</i> gravels <i>El. primigenius-trogontherii</i> gravels
		OHE INTERSTADIAL	
		SAALE GLACIAL ADVANCE	
NEEDIAN	HOLSTEINIAN	HOLSTEIN SEA	H N I E T <i>El. antiquus</i> gravels (<i>Homo</i>)
TAXANDRIAN		ELSTER GLACIAL ADVANCE	S <i>El. trogontherii</i> gravels MOSBACH 2; SÜSSENBORN (Thuringia) warm → cool steppe fauna MAUER; GRAFENRAIN PIT (<i>Homo</i>) woodland fauna
			MOSBACH 1; JOCKGRIM I warm steppe fauna
Zones of Sterksel— Budel—Woensel— Weert	CROMERIAN	BILSHAUSEN	



FIG. 6. The Steinheim-Pleidelsheim Valley and the location of the fossiliferous gravels at Steinheim (redrawn after Wagner 1929b; Adam 1954a).

rare, and it is difficult to envision an actively transporting stream. It is likely that the very few rolled specimens were distributed by periodic, seasonal floodwaters (Berckhemer 1933a, 1934).

In both the Sigrist pit (where work was stopped in 1950) and the much larger Sammet pit nearby, the profile exposes a complex of gravels and sands overlain by loesses with intercalated weathering horizons. Berckhemer (1925, 1927a,b, 1928a,b, 1929, 1930, 1933a, 1934, 1940; also Soergel 1911; Fraas 1914; Dietrich 1929; Rode 1933), through careful, long-continued study of the exposures and the fossiliferous horizons, demonstrated some years ago that the lower gravels were two-fold, each being characterized by particular faunal assemblages. Adam (1954a,b) has painstakingly continued these observations, and demonstrated a quadripartite gravel series, designated (from below upwards): (1) Older Mammoth Gravels, (2) Straight-tusked Elephant Gravels, (3) Main Mammoth Gravels, (4) Younger Mammoth Gravels. Over two hundred pieces of skeletal remains of elephant have been collected from these pits, a third of them *El. antiquus*, and two-thirds *El. trogontherii-primigenius*. The former, forest-dwelling straight-tusked, elephant is present exclusively (with the exception of two molars from a higher level) in the second lowest (2) horizon, that in which the human skull was found. The latter, steppe-dwelling, mammoth is found only within the other three gravels: (1) contains a few *El. trogontherii*, in association with *Eq. mosbachensis*, *Rh. kirchbergensis*, *B. priscus*, and *C. elaphus*; richest in (3) is *El. trogontherii-primigenius*, in

association with *B. schoetensacki*; and also richest in (4) is *El. primigenius*, in association with *Rh. antiquitatis*. The percentage distribution of the main elements of the fauna, excluding the carnivores (which constitute about five per cent of the fauna and include lion [2,3], bear [2 = *U. arctos*, 3 = *U. spelaeus*], hyena, wolf [3], and badger [2]), is shown in Figure 7. The composition of the fauna in gravels (2) is clear evidence of the prevalence of interglacial conditions at the time of their aggradation (Adam 1954a). A comparison with other faunal assemblages has shown (Adam 1954b): (a) close agreement between the steppe elephants of the later Saale Glacial stage in Saxony with those from gravels (3) at Steinheim; (b) that the wild oxen (*Bos*) in gravels (2) is of a form that appears for the first time in the Great Interglacial (Lehmann 1949), and closely resembles that from the Elster/Saale interglacial Elbe River gravels of the Welsleben pit (near Schönebeck). Moreover, the work of Staesche (1941) on the remains of rhinoceros also confirms these interpretations. There can be no question, therefore, that the gravels (2) in which the Steinheim skull was found, in association with a woodland type of fauna, are of Great Interglacial (Elster/Saale or Needian) age (Table 2). The gravels cannot be attributed to a Saale (Riss 1/2) interstadial, as Berckhemer (1933a, 1938) believed, nor to the Saale/Weichsel (Riss/Würm) interglacial, as Vaufreys (1931) once suggested.

The loesses that overlie the Steinheim gravels have been carefully studied by Freising (1952). In the Sigrist pit, there are some five meters of light, yellowish loess, representing the Main Würm, at the base of which is a loamy sandy-clay, representing the well-known Göttweiger interstadial horizon. In the neighboring Sammet pit, the same general sequence is evident from the basal *antiquus*-bearing gravels through the two *trogotherii*-*primigenius*-bearing sandy-clay levels, overlain by (presumably Last Interglacial) bedded reddish sandy-clays, and Early and Main Würm flood-loesses; the latter are subdivided by the Göttweiger loam and an overlying solifluction horizon. This succession confirms the Great Interglacial age of the straight-tusked elephant-gravels, and the Saale Glacial age of the overlying mammoth-gravels.

+60 meters altitude) is represented by conglomerates and beach sands, overlying Cretaceous marls and pre-Cambrian quartzites, in the basal portion of the section. This deposit contains rolled pebble chopping tools and some typologically Chellean (Abbevillian) hand axes, not unlike the assemblages in the lower limits of Bed II at Olduvai Gorge (northern Tanganyika). On its surface an unrolled assemblage was found (described by Neuville and Ruhlmann 1941) that reveals incipient

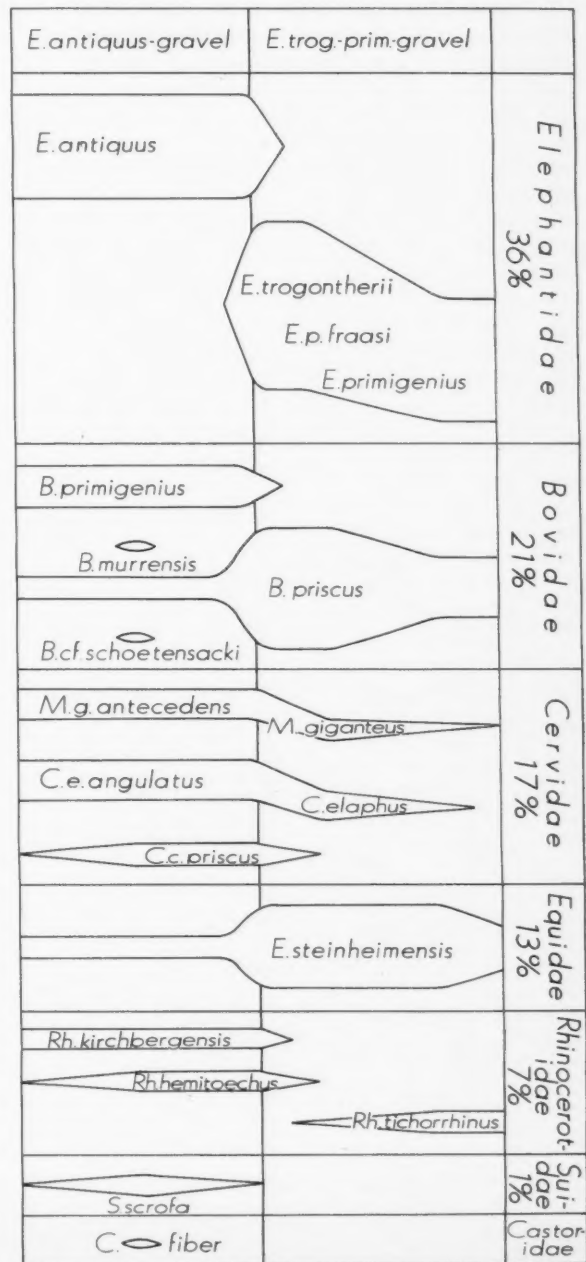
FIG. 7. Distribution of fauna (excluding carnivores) in the interglacial straight-tusked elephant gravels (2) and the glacial Main Mammoth gravels (3) of Steinheim (after Adam 1954a).

ATLANTIC COAST OF MOROCCO

SIDI ABDERRAHMAN

The Atlantic coast of Morocco, a region relatively stable since the final Tertiary (in this regard unlike the Mediterranean littoral of the Magreb; cf. Dalloni 1940, 1954), has preserved one of the best known Pleistocene successions (for general discussion, see Balout 1955; Vaufray 1955; also Alimen 1955; Choubert 1956, 1957; Gigout 1957; Gigout and Raynal 1957). The littoral, subject to alternative fluctuations of sea level as ocean water was successively locked up in ice during continental glaciation and later returned to the sea as meltwaters during interglacial deglaciation, is characterized by a series of well-developed ancient marine beaches, intercalated with which are continental formations. The highest of these marine deposits, either two or three in number, range up to +300 meters for the oldest, and +100 to +60 meters for the next younger. These are generally attributed to the Calabrian (probably including the Emilian) and the Sicilian transgressions of the earlier Pleistocene (Lecointre 1952). The former, which in fact represents a progressively regressive sea, analogous to the Waltonian-Weybournian Seas of Britain and the Netherlands, is surely contemporaneous with the continental Villafranchian; the latter corresponds perhaps with the Netherlands Tiglian, but most likely with the younger Cromerian stage. More important for consideration here is the well-developed and often continuous beach of the +30-meter marine transgression, with an invading molluscan fauna that includes *Purpura haemastoma* and *Patella safiana* (in the Mediterranean, *Strombus bubonius*). This represents the Tyrrhenian I (= Tyrrhenian *sensu strictu*) of the Mediterranean marine Pleistocene succession, upon the Great Interglacial age of which practically all workers concerned are in agreement.

One of the localities where littoral accumulations of this sea and related continental formations are best exposed is Sidi Abderrahman, a few kilometers south of Casablanca, where a number of commercial quarries have been opened (Fig. 8). In 1954 one of these quarries, long known for its richness in Acheulean implements, provided a portion of a human mandible in an unusually well-dated context (Biberson 1955, 1956). The terminal or regressive phase of the Sicilian (+55 to



traces of a true cylinder-hammer technique for working hand axes; the assemblage contains hand axes and numerous flakes and the first true cleavers in the Moroccan succession (Biberson 1954). This would indicate a transitional Chelleo-Acheulean industry, like that represented, for example, by stages 4-5 in the uppermost part of Bed II at Olduvai Gorge (Leakey 1951).

These conglomerates are overlain by beach sands grading into continental calcareous sands of aeolian origin that make up the prominent Great Dune formation. These sands were subsequently consolidated into sandstone during the Romanian marine regression (Bourcart 1943), a time corresponding broadly with the first major continental glaciation (Elster) in northern Europe. During the initial phases of the Tyrrhenian (I), a transgressive sea carved out a tortuous coastline in this dunar cliff, and percolating waters eroded out karstic caves (Fig. 8, inset). The caves and fissures were periodically occupied by cave-dwelling animals (bears and hyenas), and also were from time to time inhabited by early man; however, the high seas of the Tyrrhenian disturbed and rearranged these continental accumulations at the base of the caves and buried them under marine sediments.

In general, the stone tool assemblages from these caves extend from earliest Middle Acheulean of proto-Levallois technique (stage 1), represented in basal Tyr-

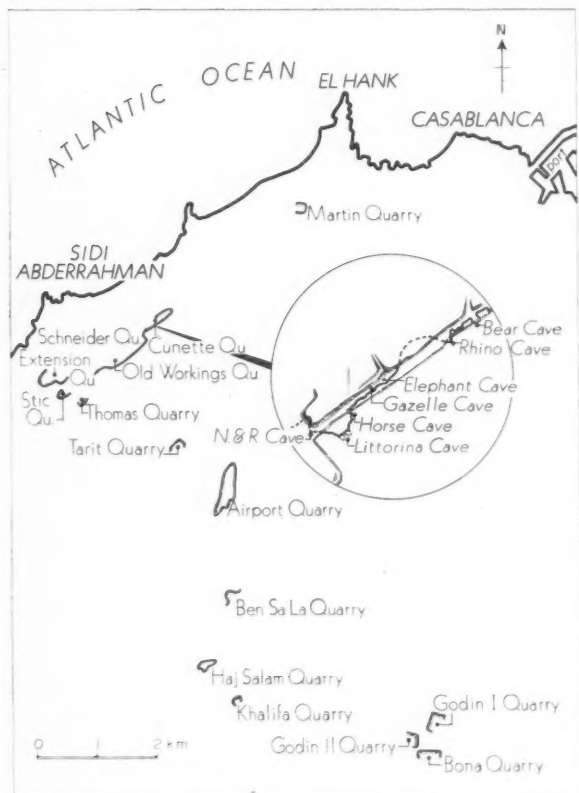


FIG. 8. The Atlantic littoral of Morocco indicating the main quarries of paleoanthropological interest, with (inset) the Schneider quarries at Sidi Abderrahman (redrawn after Biberson 1955, 1956).

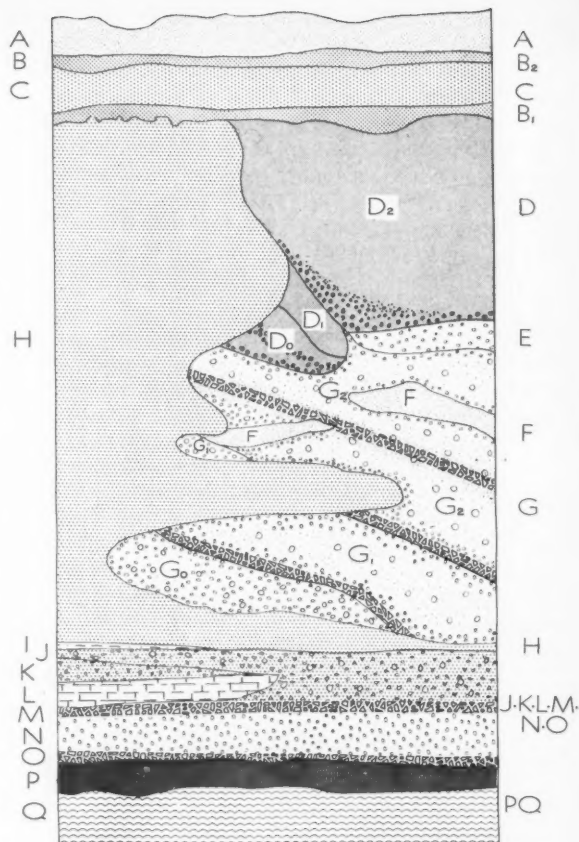


FIG. 9. Succession of deposits exposed in the Sidi Abderrahman (Cunette) quarry (left), and the deposits filling the karstic cave cut into the great consolidated dune H (right). The nomenclature on the left is that of Neuville and Ruhlmann (1941); that on the right is the nomenclature currently employed by Biberson (redrawn after Biberson 1955).

renian levels in the Cave of the Bears, through a more developed Middle Acheulean (stage 2), represented in the Littorina Cave, into later expressions (stages 3 and 4) of Middle Acheulean, represented in the S.T.I.C. quarry and the Sidi Abderrahman extension, all of which are of post-Tyrrhenian regressive age. A final Acheulean or Micoquian is also known from calcareous crust formations formed at the time of the ensuing interpluvial (= Tyrrhenian II transgression, or Eemian of the Netherlands).

The Littorina Cave (Fig. 9), which has provided the portion of human mandible (Arambourg and Biberson 1955), reveals a series of basal Tyrrhenian marine deposits (G_0 – G_1 – G_2), consisting of gravels, pebbles, and sands that contain molluscan shells, derived mammalian remains, and Acheulean implements; sometimes there are also intrusive marine sandstone lenses, redistributed by running waters as slope wash. A series of continental deposits (D_0 – D_1 – D_2), sandy and clayey with pebbles, and the topmost brecciated, overlie these marine deposits unconformably, an interval of erosion separating the accumulation of the two series. The fauna from these two series of beds is typically tropical

African, and includes remains of *El. iolensis*, *Rh. simus*, *Eq. mauritanicus*, *H. amphibius*, various antelopes (*Hippotragus*, *Connochaetes*, *Alcelaphus*) and gazelles (*Gazella atlantica*, *G. dorcas*), several hyenas, a fox, wild dog, and ostrich; there is also wild boar (*S. scrofa*) and wild ox (*B. primigenius*).

The human mandible was found in a sandstone lens ($F = D_0$) at the base of the continental series of deposits. The associated stone tools represent a Middle Acheulean (stage 2) assemblage, numbering 254 pieces (114 of which are waste). More than fifty per cent of the tools were made with stone-on-stone technique, the flake tools being struck from unprepared pebble cores. The proto-Levallois technique, present in the earlier Tyrrhenian deposits in the Cave of the Bears, is entirely absent in this *Littorina* Cave assemblage. The latter comprises numerous hand axes (72), mostly pear-shaped and lanceolate with only rare ovates, rare cleavers (3), a considerable number of pebbles (34) worked into chopping tools and crude bifaces, unifacial tools (13), bifacially worked side-scrapers (2), rare hammerstones (3), cores (3), and bifacially trimmed discs (10) (Biberson 1956).

The *Littorina* Cave human mandible and the associated Acheulean industry is thus clearly dated to the termination of the Tyrrhenian (I) transgression, corresponding in time to the very onset of the post-Tyrrhenian regression and the Penultimate North African pluvial stage. This corresponds with the Drenthian of the Netherlands and the Saale Glacial of northern Germany).

RABAT

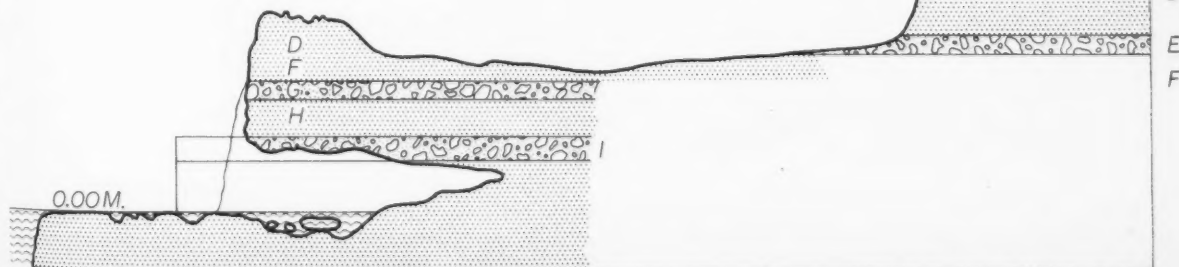
In 1933 the Rabat sandstone, or "Great Dune," exposed in the Khebibat (or Mifsud-Giudice) quarry on the sea front of Rabat, provided the first Middle Pleistocene human remains ever found in northwest Africa. The specimen, perhaps a nearly complete human skull originally, was exposed by blasting in the quarry, but was later reburied by the local workmen. Marçais (1934) was eventually able to recover twenty-three fragments, aside from the original portion of mandible given him by the quarry manager.

As at Sidi Abderrahman, the consolidated sandstone of the "Great Dune" forms a prominent feature of the topography of the Rabat littoral (Bourcart 1943). Jaranoff (1936) noted some years ago that this sandstone was complex, with two dunes being separated by a purely marine horizon. This conclusion was confirmed by subsequent investigations (Choubert and Marçais 1947;

Bourcart, Choubert, and Marçais 1949). Between the Khebibat quarries and Chellah hill to the northeast, the lower part of this marine sandstone, with alternating pebbly molluscan (*Littorina*) beds, overlies a submerged basal conglomerate containing *El. cf. meridionalis*. These appear to represent, just as at Sidi Abderrahman, marine formations of the Sicilian transgression. In the Khebibat quarry the surface of this sandstone has been eroded, and, according to Neuville and Ruhlman (1942; also Ruhlman 1945a,b), is overlain unconformably by a shelly (*P. haemastoma*) marine conglomerate, above which is another consolidated calcareous sandstone, some eight to ten meters thick (Fig. 10). The human remains were found in the middle portion (the exact level is unknown) of the upper Rabat sandstone. This sandstone has yielded also a typically tropical African faunal assemblage, including *Rh. simus*, *Eq. mauritanicus*, *H. crocuta spelaea*, *H. amphibius*, *B. primigenius*, *G. atlantica* and *Bubalus boselaphus* (Arambourg 1938; also 1952).

It seems quite clear that the Rabat lower sandstone is of post-Sicilian (I) age. Sometimes this has been referred to as an horizon of "Milazzian" age; however, this marine horizon is distinct not even in the type locality. As at Sidi Abderrahman, this marine formation was exposed to weathering and became consolidated during the Romanian regression (= Amirian pluvial). Leconte (1952, 1953) earlier stated that the human remains were correspondingly of this same age, since they post-dated the *Littorina* conglomerate, and were earlier than the *P. haemastoma* conglomerate; he did not believe that a conglomerate with *P. haemastoma* occurred below the upper sandstone, except in places where there was infilling, which he attributed to an Upper Pleistocene or Ouljian (cf. Gigout 1957) transgression. However, such a shelly conglomerate is present, as Choubert (1955) has demonstrated, so that the "Great Dune" at Rabat is not wholly of the same age as that at Sidi Abderrahman. The upper portion of the sandstone represents a Tyrrhenian I dune. The human remains and the mammalian fauna must be contemporary with the post-Tyrrhenian (I) regression, or, under the newer ter-

FIG. 10. Succession exposed in the Khebibat quarry, Rabat, Morocco (redrawn after Neuville and Ruhlmann 1942).



minology, with the Tensiftian pluvial (Biberson and Lecomte 1956). The human remains are, therefore, broadly contemporaneous with those from the Littorina Cave at Sidi Abderrahman.

ALGERIAN PLATEAU: TERNIFINE

The Algerian site of Ternifine (or Tir'enfin) is a large sand pit situated several hundred meters west of the village of Palikao, twenty-two kilometers east of Mascara, department of Oran. Commercial working of a large hill of sand opened the pit in 1872. Shortly thereafter, it yielded the first of a considerable series of mammalian fossils (Pomel 1879), and subsequently yielded also stone tools (Tommasini 1883; see Balout 1955 for an excellent summary of the earlier investigations at the site). In 1886 and 1888, Pallary (Pomel and Pallary 1888) carried out investigations in the upper levels and recovered considerable fauna, much of it being described in the paleontological memoirs by Pomel (1893-98). This work, restricted to the zone above water level, exposed two main horizons, from two to three meters in thickness, within each of which were several sandy horizons, some sterile and others containing stone tools (pebble tools, bifaces, cleavers, and flakes) and/or mammalian fossils.

The true nature of the site was first revealed by Arambourg (unpublished) in 1931; further work in 1954 and 1955, in the lower flooded levels, provided additional fauna, stone implements, and the first human skeletal remains (Arambourg 1954b,c; Arambourg and Hoffstetter 1954). The site is a small lake basin filled during the Middle Pleistocene with fossiliferous and implementiferous sands. During the existence of the lake, the plain of Eghris in which it is situated was some twelve meters higher than at present, which indicates that extensive erosion and denudation took place during the later Middle and Upper Pleistocene. As in the present-day neighboring Lake Palikao, the waters are of artesian origin, and the lower levels remain submerged (necessitating the use of pumps in the recent excavations). The uppermost levels of the profile (Fig. 11) exposed at Ternifine are sandstone bands, hardened by surface exposure as the waters of the ancient lake evaporated; these deposits cap and preserve the softer, underlying, unconsolidated, siliceous clayey-sands. All the beds of sand are horizontally disposed, or reveal a very slight concavity, and their margins can be defined at the edge

of the small basin. Arambourg's (1954a) work now indicates that there is no evidence to support Pomel's view that the sands were carried up by artesian waters and deposited around active springs.

The mammalian faunal assemblage from the site is a very rich one, and is particularly important for determining the relative geological age of the site. Many of the bones are broken, especially those with large medullary cavities, and it is likely that the activities of early man are to some extent responsible; cranial remains are distinctly rare, although a complete elephant skull was found in 1954. The typical African savannah fauna includes very abundant hippopotamus (*H. amphibius*), zebra (*Eq. mauritanicus*), hartebeest (*Alcelaphus*), wildebeest (*Connochaetes*, *Gorgon*), gemsbok (*Oryx*), buffalo (*Bubalus*), sheep (*Ovis*), gazelle (*Gazella* sp.), giraffe, camel (*C. thomasi*), elephant (*El. atlanticus*), rhinoceros (*Rh. mauritanicus-sinus*), carnivores (*Felis* sp., *H. crocuta spelaea*, *C. anthus*, and a sabretooth, *M. latidens*), as well as a giant wart-hog (*Afrochoerus* sp.), and a giant baboon (like *Simopithecus*). This fauna, considerably different from that of the North African Villafranchian (cf. Arambourg 1949), is characterized by some elements absent from, and also lacks some elements present in, later Middle Pleistocene faunas (such as those at Rabat and Sidi Abderrahman) (Arambourg 1952). This would suggest an earlier Middle Pleistocene age, either before or very early in the Tyrrhenian (I) stage. This conclusion is broadly confirmed by the assemblage of stone tools in quartzite or dolomite, recovered from the Ternifine Sands. It comprises choppers and chopping tools, rare polyhedral spheroids, block-on-block flakes some retouched as scrapers and borers, and hand axes and cleavers. The hand axes are numerous; they are made of pebbles or fragments of pebbles, and are thick and often show traces of cortex. Long or more pointed piriform shapes are uncommon, and most are roughly pear-shaped. There are few cleavers, and they are made with block-on-block technique from unprepared cores or pebbles. This assemblage, as recently described by Balout and Tixier (1957), is homogeneous and represents an early Acheulean industry, like stages 1 and 2 (the "Clacto-Abbevillian" of Neuville and Ruhlmann 1941) of the S.T.I.C. site at Sidi Abderrahman (cf. Balout 1955). The latter, resting on the surface of the Sicilian conglomerate, dates toward the end of the Romanian re-

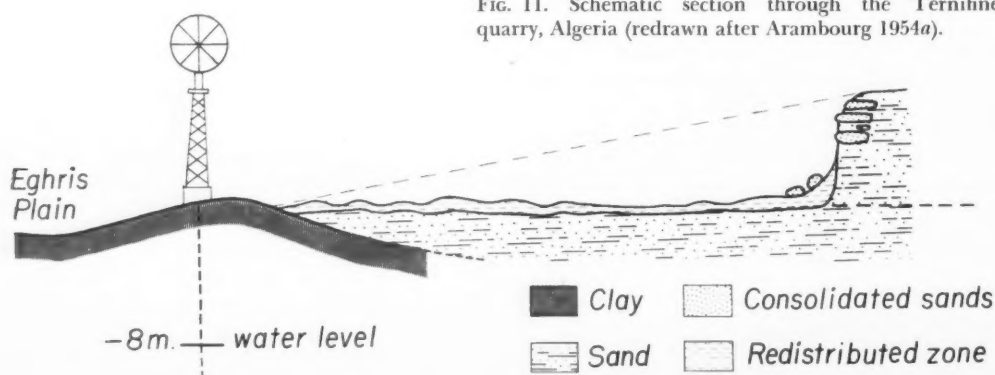


FIG. 11. Schematic section through the Ternifine quarry, Algeria (redrawn after Arambourg 1954a).

gression, as has been noted previously. Thus, on these grounds, the Ternifine human skeletal remains are the oldest known from Northwest Africa.

The temporal interrelationships of the Middle Pleistocene human remains from northwest Africa are shown in Table 3. Gigout and Gourinard (1956) have recently offered a correlation between the Moroccan Atlantic and the Algerian Mediterranean littorals. The correlation offered here is in general agreement with

theirs, except for the present writer's subdivision of a two-fold Sicilian marine stage (cf. Choubert 1956, 1957).

GENERAL CONCLUSIONS

Human skeletal remains earlier than the Upper Pleistocene are but sparsely represented from widely scattered sites in Britain, westernmost Germany, and the Atlantic and Mediterranean littorals of northwest Africa. The scarcity of human fossils is due largely to a dearth of actual occupation sites and to the apparent general absence of burial practices among these primi-

TABLE 3. Provisional correlation of Middle Pleistocene stratigraphy of the Moroccan littoral and the Algerian littoral, with correlative stages in the Netherlands marine succession.

NETHERLANDS		ATLANTIC MOROCCO		ALGERIA	
		CASABLANCA	RABAT	LITTORAL	INLAND
DRENTHIAN	Tensiffian	V D ₂			
		IV Sidi-Abd Extension	Consolidated dune (<i>Homo</i>)		Clairfontaine Lac Karar Champlain
NEEDIAN	TYRRHENIAN I	III cont. sands, loams and gravels D ₁			evolved M. Acheulian
		II → <i>Homo</i> D ₀ (=F)			
TAXANDRIAN	Amirian	I ← M. Acheulian → Karstic caves developed in Great Dune	Marine conglomerate		
SICILIAN	Sicilian II				
SICILIAN	Sicilian I				

tive peoples. In the cases of the Mauer and Steinheim specimens, local geological factors, related to tectonics and the meanderings of the Neckar River and its tributary the Murr, afforded favorable circumstances for the accumulation of skeletons of Middle Pleistocene animals, including a human skull. At Swanscombe, there is every indication of actual occupation sites of peoples of the Acheulean, adjacent to the small tributary channels of the sluggishly meandering Thames River. At Ternifine, the situation is less clear, the human remains and other mammalian bones, as well as earliest Acheulean implements, being found in fresh condition at the base of a small depression once occupied by a mere or small lake. Primitive hunting-and-gathering peoples of the Acheulean presumably occupied the margins of this body of water, and it may be that the occurrence of unrolled bones and tools in the floor of the basin is a reflection of man's activities in discarding rubbish (also the opinion of C. Arambourg, personal communication). Only at the Littorina Cave, and perhaps at Swanscombe, is there evidence of a probable occupation site originally *in situ*, but in each case subsequently disturbed. None of these occurrences is comparable to an occupation site like Locality 1 at Choukoutien, or to the open-air habitation sites of eastern Africa represented by localities in Olduvai Gorge and at Isimila in Tanganyika, or at Ologesailie and Kariandusi in Kenya. Torre in Pietra, a littoral occupation site of peoples of the Acheulean that is situated west of Rome, has provided stone tools and fauna (largely horse) from an ancient land surface (A.C. Blanc, personal communication), but human skeletal remains are lacking, as they are generally at the otherwise rich eastern African sites.

All these human remains are of broadly Middle Pleistocene age, but their relative datings are in fact spread over a considerable range of this span of time.

The famous Mauer mandible is of the greatest antiquity, and dates from an "interglacial" interval prior to the Elster Glaciation. This interval presumably corresponds with the ameliorative phase between the North Sea (Norwich) and the Lowestoft Glacial advances. It seems likely that this interval is represented in certain sections by the second regressive phase of the Sicilian transgressive stage (sometimes termed "Milazian"). Somewhat younger are the recently recovered human remains from the Ternifine sand pit, found in

association with an archaic Middle Pleistocene fauna and an early Acheulean industry. On faunal grounds, these remains are pre-Tyrrhenian (I). They date broadly from the same stage as the well-known fossils of Java man (*Homo erectus*) from the Trinil beds. The earlier Javan hominids from the Djetis beds, *H. modjokertensis* and "*Meganthropus*," are pretty clearly post-Villafranchian, but presumably still older than the Mauer jaw. This conclusion is based on Hooijer's (1952, 1957; Hooijer and Colbert 1951) recent analyses of the faunal succession in Java, work of great importance for correlation of the Pleistocene sequence established there.

The two well-preserved, but damaged or incomplete, skulls, from Steinheim and Swanscombe, are representative of European peoples of the latter part of the Great Interglacial. In the latter case, the industrial association is broadly Middle Acheulean; the assemblage is considerably advanced in comparison with that found in association with the Ternifine human remains. It is strange that no stone implements have ever turned up either at Steinheim or at Mauer. The Steinheim and Swanscombe specimens are broadly contemporaneous with the people of the renowned site of Choukoutien, Locality 1, found in association with the Choukoutienian chopper/chopping-tool industry (Movius 1944, 1949a).⁶

Somewhat younger are the human remains from the Littorina Cave at Sidi Abderrahman and from the Rabat sandstone. Both are clearly dated to the early post-Tyrrhenian (I) regressive stage. They thus correspond to the onset or early phase of the Penultimate Glaciation (Tensiftian Pluvial).

MORPHOLOGY OF THE SKELETAL REMAINS

EARLY MIDDLE PLEISTOCENE

Skeletal remains of pre-Great Interglacial peoples from Europe and Mediterranean Africa are restricted to mandibles and the lower dentition; a single parietal bone from Ternifine represents the only portion of cranium known. The general lack of cranial remains complicates comparisons with the southeastern Asian peoples from the Djetis and Trinil beds of Java, which, with the exception of the Sangiran B mandible fragment (from the Djetis beds), are known nearly wholly

TABLE 4. Some measurements of Middle Pleistocene hominid mandibles.

	Sangiran B	Choukoutien G ₁	Choukoutien H ₁	Mauer	Ternifine 1.	Ternifine 2.	Ternifine 3.	Sidi Abderr.	Montmaurin
Symphysial ht.	39	40	32.5	34	39	35	39	—	(29)
Body ht. (behind M ₁)	31.1	33.2	25.4	34.3	35	34	38	34.5	(31)
Body thickness (behind M ₁)	18.9	18.8	16.6	22	19	16	20	17	(16)
Ramus ht.	—	74	77	71	—	72	93	—	(70)
Ramus breadth	—	40.7	39.7	52	—	45	48	—	(45)
Mandibular angle	—	97°	108°	105°	—	98°	111°	—	110°
Total length	—	103	94	120	110	110	129	—	(116)
Bicondylar breadth	—	150	102	133	—	—	158	—	(137)



FIG. 12. Right lateral and occlusal views of the Mauer mandible. (Photographs courtesy of B. Engels, Geologisch-Paläontologisches Institut, Universität Heidelberg.)

from crania. However, aside from the Sangiran B mandible, the remains of the later Choukoutien Locality 1 people provide some materials for comparison.

The Mauer mandible (Schoetensack 1908; Wust 1951) is still the earliest known human fossil from either Europe or Mediterranean Africa. In common with other early men, it is massive and robust (Table 4), the mental foramina are multiple (3 right, 2 left), the symphyseal region is posteriorly inclined, and the alveolar arch is characteristically parabolic. However, it has certain unique features, including (1) the extraordinary breadth of the ramus, massive-rounded-off and low coronoid process, and related shallow sigmoid notch; (2) the extreme depth of the prelastral segment of the body, related to the marked inferior extension of the marginal torus and anterior marginal tubercle (resulting in the formation of a cupid's-bow shaped submental incisure); and (3) the relatively moderate size of the dentition compared to the massiveness of the mandible (Fig. 12). In these aspects of its morphology, the Mauer specimen is distinguished from broadly contemporaneous peoples of southeastern Asia as well as from the somewhat younger northwest African Ternifine people. There are also some minor differences, compared to the Choukoutien mandibular morphology, in the architecture of the ramus: on the lateral surface the mandibular angle is scarcely everted and a true masseteric fossa is absent, both features being related to the pattern of development of the masticatory musculature; the ectocondyloid crest (and lateral sub-condyloid tubercle) is absent; on the medial surface the attachment area for the internal pterygoid muscle is extensive,

but the superior and inferior pterygoid tubercles are not especially developed.

As in all hominids, the anterior dentition is reduced relative to the posterior. However, this reduction largely affects the crowns of the teeth, and the roots of the canines and incisors are still robust and long (Fig. 13). Consequently, as Weidenreich (1936, also 1934) has clearly shown, the symphysis is thick, the alveolar plane well-developed, the superior transverse torus is massive with a marked genioglossal fossa below it, the alveolar and basal arches are scarcely separable (only a faint depression corresponding to the anterior symphyseal incurvature), and a bony chin (*mentum osseum*) is altogether absent (Fig. 14); the presence of a true mental trigone is difficult to confirm, but a low rounded protuberance marks the symphyseal tuber. The digastric fossae, separated anteriorly by a rounded basal trigone, are broad and relatively short (rather than long and narrow as in the Choukoutien folk), and, although extensive anteriorly, are also directed backward onto the basal arch.

The Mauer incisors show a basal lingual tubercle and slight marginal ridges. The canine, unfortunately much worn, is swollen buccally, and exhibits a basal lingual tubercle as well as a median, and marginal lingual ridges. The molar series is not, as is sometimes claimed, especially small, except in comparison with the massiveness of the mandible. The dimensions of these teeth fall fully within the range of variation of the Choukoutien Locality 1 people, as well as of most of the Middle Pleistocene peoples of northern Africa (Table 5).

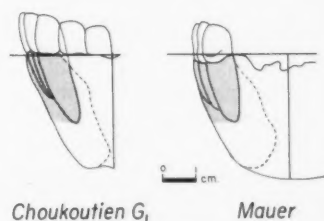


FIG. 13. The symphyseal region and emplacement of anterior teeth in the Mauer and Choukoutien G₁ mandibles (redrawn after Weidenreich 1936).



FIG. 14. Mid-sagittal sections through the symphyseal region of some Middle Pleistocene hominid mandibles (redrawn after Von Koenigswald 1940; Weidenreich 1936; Vallois and Roche 1958).

The crown of P_1 is asymmetrical, consequently its transverse axis is obliquely oriented, with full and prominent buccal cusp, from the apex of which ridges extend mesially and distally, and a small buccally-situated lingual cusp; a median ridge extends between the cusps, and the anterior and posterior foveae are well developed; there is slight buccal swelling of the crown but no true cingulum. The crown of P_2 is symmetrically rounded, and the prominent buccal and small lingual cusps are joined by an enamel ridge; the anterior, and particularly the posterior, foveae are well defined. The molars, moderately taurodont, are longer than wide, the third molar being reduced and the second molar the largest of the series, as is frequently the case in other early hominids. A cingulum, or even traces of it, is lacking. The cusp pattern is of the dryopithecine sub-Y5 (M_1) or +5 (M_2 , M_3) pattern, with a well-developed hypoconulid and prominent metaconid and hypoconid; probably M_3 , and certainly M_2 , possessed a sixth cusp. In M_1 and M_2 the hypoconid-metaconid contact is evident, but in M_3 the enlarged entoconid is in contact with the protoconid.

Lack of additional human skeletal material from this time level limits generalization, since it is impossible to control the range of variability within the population of which the Mauer specimen is an isolated sample. Nevertheless, there are fundamental differences, expressed in both the mandibular and dental morphology, between the Mauer individual and such eastern Asian forms as the individual (B) from the Djetis beds at Sangiran (Von Koenigswald 1940; Weidenreich 1945) and the younger Choukoutien Locality 1 population (Weidenreich 1936, 1937). A considerable period of genetic isolation was clearly required to produce such divergences, if these respective peoples were commonly derived from a primitive hominid radiation, such as might be represented by an unspecialized form of australopithecine.

The recent discovery of three human mandibles (Arambourg 1954c, 1955a,b,c, 1956), other isolated teeth, and a parietal bone (Arambourg 1955d) at Ternifine ranks as an event of prime importance in human paleontology. The need for caution in arriving at far-reaching conclusions from isolated specimens is indicated by the morphological variability of these remains.

The three Ternifine mandibles are all extremely robust and massive (Table 4). No. 3 (Fig. 15) is the largest, its length and (bicondylar) breadth exceeding even that of the Mauer mandible. In all specimens, the borders of the body are parallel; in No. 1 (Fig. 16), there is a prominent marginal torus (less developed than in Mauer, however), with anterior and posterior marginal tubercles. The marginal torus and anterior marginal tubercle of No. 3 are also prominent; the former is delimited by a well-defined inter-toral sulcus. This development of the torus accentuates a prominent circumflex-formed submental incisure. As in other early hominids, there is a tendency for multiple mental foramina, two in No. 1, and two (right) or three (left) in No. 3; in No. 2 the foramen is single; the foramina are situated either below the second premolar (No. 3) or between the premolars. In all specimens, the symphysis is thick and inclined posteriorly; its anterior face, in both No. 2 and No. 3, and as in the Choukoutien people, reveals the presence of a slight mental trigone, but no *mentum osseum*. The lingual symphyseal surface is strongly inclined backward, and the alveolar plane is markedly developed (especially in No. 2 and in No. 3) and slightly concave. Only in No. 3 is there development of the superior transverse torus; but this structure is much less pronounced than in the specimen from Mauer, and approaches the reduced condition found in the Sangiran B specimen and in those from Choukoutien Locality 1. In No. 2 there is a slight genioglossal fossa, at the base of which the foramen supra-spinosum opens; in No. 3 the fossa is more clearly delimited and deeper; below it the genial tubercles are united in a salient submental spine. In the Choukoutien folk there is no pit, but a "real mental spine" with upper tubercles for the genioglossi and fused lower tubercles for the geniohyoid muscles (Weidenreich 1936). In No. 1 and No. 2, the digastric fossae are relatively short, but much more extensive in No. 3; in Nos. 1 and 3, these occupy only the ventral face of the basal arch, but in No. 2 there is a tendency for expansion obliquely backward onto the lingual face of the body.

TABLE 5. Dimensions of lower premolar and molar teeth in Middle Pleistocene hominids and in the australopithecines (*Australopithecus* and *Paranthropus*).

		Sterkfontein	Swarthkrans	Sangiran B.	Choukoutien Loc. 1	Mauer		Ternifine 1.	Ternifine 2.	Ternifine 3.	Sidi Abderr.	Rabat	Montmaurin	
						r	l						r	l
P_1	b	11.7-11.8	10.6-12.9	—	8.9-10.8	9.0	—	9.0	11.2	10.0	9.6	10.0	—	—
	l	9.0-9.2	9.2-10.5	—	7.9-9.8	8.1	7.3	8.5	9.0	8.0	9.0	9.0	—	—
P_2	b	11.6-11.7	12.0-17.0	11.0	8.0-11.1	9.2	—	10.0	10.5	10.0	—	—	—	—
	l	9.8-10.1	10.3-12.5	9.2	8.5-9.2	7.5	—	8.0	9.5	8.2	—	—	—	—
M_1	b	11.2-13.9	13.0-15.2	13.0	11.1-12.6	11.2	—	12.0	13.0	11.8	11.6	11.0	10.5	10.7
	l	13.0-15.1	14.3-16.1	12.5	11.3-13.6	11.6	11.1	12.8	14.0	12.0	13.0	13.0	12.5	12.5
M_2	b	13.2-15.3	13.9-16.2	13.2	11.4-12.9	12.0	—	13.7	13.7	12.1	11.4	11.3	11.0	11.0
	l	14.3-16.8	15.0-17.4	13.0	11.9-12.9	12.7	12.9	13.0	14.2	12.0	14.4	12.5	12.0	12.5
M_3	b	12.7-14.8	12.9-16.5	12.5	10.0-12.4	10.9	11.3	12.5	12.5	11.5	11.2	10.6	10.7	11.0
	l	13.5-16.7	15.4-18.5	14.5	10.0-12.9	12.2	11.5	12.0	13.2	8.0	12.2	12.0	13.0	13.0

As is the case in the Choukoutien people, there is fairly marked variability in the form of the mandibular ramus. In No. 2 (Fig. 17) the ramus is relatively broad, but low, with short truncated coronoid and shallow mandibular (sigmoid) notch. However, in No. 3 the ramus is not only broad, nearly attaining the dimensions of the Mauer specimen, but extremely high and more posteriorly inclined; the coronoid process is extraordinarily prominent and massive, exceeding the condyle in height, with an attendant narrow and deep sigmoid notch. All these features are reminiscent of the smaller G_1 specimen from Locality 1 at Choukoutien. The mandibular angle (111°) is truncated in No. 3, as it is in Mauer, with a very thick margin that is slightly everted in its lower portion but twisted inward in its upper half; this also corresponds rather closely to the morphology of the Choukoutien G_1 specimen. The masseter and internal pterygoid insertion areas are especially salient, the ectocondyloid crest is pronounced, and a thick ridge is developed throughout the vertical extent of the thickened anterior margin of the coronoid; in No. 2, on the other hand, these features are either absent or much attenuated.

In all three specimens, the dental arch is parabolic, being most rounded in No. 2; but, in No. 3, the pre-lacteal portion projects farther anteriorly due to the robust canine-incisor series (Fig. 18). The form of the arch in the Ternifine specimens approximates closely to that of the Choukoutien people; however, among the former the arch is more posteriorly divergent, reflecting some differences in the form of the palate and the structure of the facial skeleton. The Mauer arch is smaller, especially its pre-lacteal portion, which is also more gently and symmetrically curved.

The teeth of the Ternifine peoples are relatively macrodont, as in the case of most other early Middle Pleistocene hominids (Table 5). It is interesting to note that the extremely robust No. 3 mandible has, in general, smaller teeth than the other two specimens, especially No. 2, which has the largest teeth, but a more gracile mandible. The incisors are unknown, except for a very worn right lateral in No. 3, which is small-crowned; however, the dimensions of the sockets for these teeth indicate that there was some tendency for root reduction. The canines, a very worn example of which is preserved in No. 3, were evidently large-crowned with robust and deep roots, as in the Choukoutien folk.

The premolars are large, both absolutely and relative to the size of the molars. In Nos. 1 and 2, the crown of P_1 shows a large compressed main cusp on the buccal margin, from the apex of which ridges extend mesially and distally; a smaller lingual cusp is situated somewhat distally on the lingual margin. Both anterior and posterior foveae are well developed. The crown is asymmetrical, there being poor development of the mesio-lingual margin, so that the transverse axis through the cusps passes obliquely to the plane of the mesio-distal axis. On the mesial and distal edges of the crown, there are well-defined oblique cingular ridges. The same basic structure is evident in the more worn right P_1 of specimen No. 3. The root system is semi-bifid, with separate pulp chambers. In general, the crown and root structure of this tooth in the Ternifine remains is remarkably

similar to that of the Choukoutien folk. This morphology is also present, in a more primitive condition, in the Villafranchian hominid, *Australopithecus*, as Robinson (1956) has so clearly shown.

The crown of P_2 is symmetrically shaped, and rectangular, or sub-rectangular, with rounded buccal margin. In No. 2, in which this tooth is least worn, there are numerous wrinkles on the occlusal surface. This is a double-rooted tooth, at least in the No. 3 individual. The buccal cusp is very large, with a well-defined prominent mesial ridge passing inward from its apex. The lingual cusp, of considerable size in specimens Nos. 1 and 2 especially, is situated opposite the buccal cusp on the mesial half of the crown. The anterior fovea is evident, but the posterior fovea is particularly prominent and large; a low triangular ridge extends buccolingually between these cusps, and separates the foveae. The anterior and posterior walls bounding these foveae are in general well developed. The talonid is relatively large, especially in Nos. 2 and 3 in which a cusp is nearly formed on the disto-lingual margin (a condition found in some modern human populations). Mesial and distal oblique cingular ridges are clearly evident on the buccal faces of the teeth. This basic crown pattern, present in the australopithecines (Robinson 1956), is also common in the eastern Asian hominids from Java (Sangiran B mandible) and Choukoutien (however, in the latter the crown of P_2 is rather more rounded, and approaches more closely the shape found in the mandible from Mauer).

The lower molars of the Ternifine mandibles are in general large, although there is a fair range of variability in the three specimens (Table 4). The second molar is the largest in the molar series, and reduction of M_3 is evident in all three individuals. This condition is also characteristic of the Choukoutien population, but the earlier Sangiran mandible from the Djetis beds lacks such reduction, and this tooth is the largest of the series. In No. 2, all the molars are longer than wide; but, this feature is not general, since M_2 and M_1 of specimen No. 1, and M_2 and M_3 of specimen No. 3, are wider than long (Table 4). This same variability is evident, however, in the Choukoutien people, and in the older remains from the Djetis beds. The Ternifine lower molars exhibit a dryopithecine Y5 or +5 cusp pattern, with predominance of the metaconid and a characteristic metaconid-hypoconid contact. However, the cusp pattern of the molars is rather variable and perhaps in the process of change; for example, in individual No. 2, the last two molars are considerably squared-off, and the hypoconulid somewhat reduced in size, indicative of the modification antecedent to the +4 pattern. A sixth cusp occurs in M_2 and M_3 of individual No. 2, and perhaps in M_3 of individual No. 3. Extensive crenulations of the occlusal surface, so well known in the Choukoutien Locality 1 folk, were probably characteristic (judging from the least worn P_2 and molars of individual No. 2). Traces of a cingulum on the swollen buccal surfaces of the molars are evident in the No. 2 specimen, and also on M_1 and M_2 of the No. 3 specimen. Nearly all these features are characteristic of the Middle Pleistocene peoples of eastern Asia.

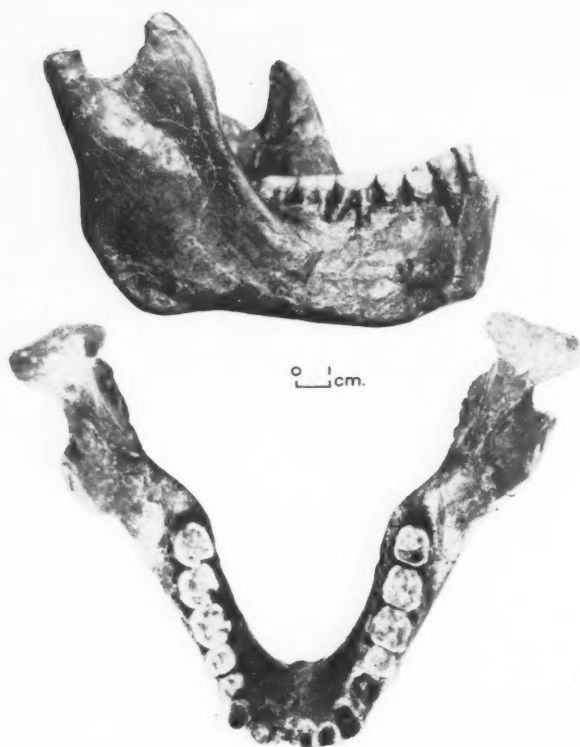


FIG. 15. Right lateral (slightly oblique) and occlusal views of the Ternifine 3 mandible. (Photographs courtesy of C. Arambourg.)

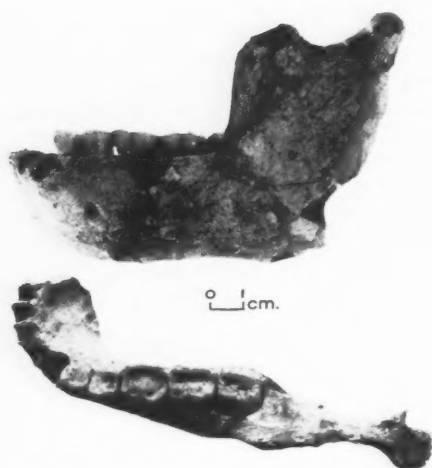


FIG. 17. Left lateral and occlusal views of the Ternifine 2 mandible. (Photographs courtesy of C. Arambourg.)



FIG. 16. Right lateral and occlusal views of the Ternifine 1 mandible. (Photographs courtesy of C. Arambourg.)

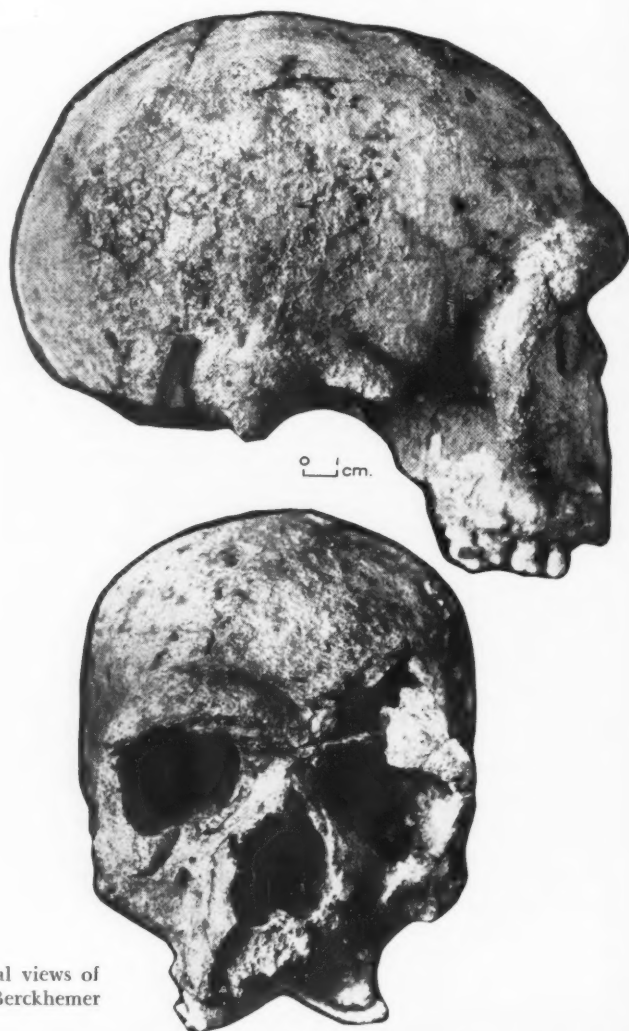


FIG. 20. Right lateral and frontal views of the Steinheim cranium (after Berckhemer 1934; Weinert 1936).

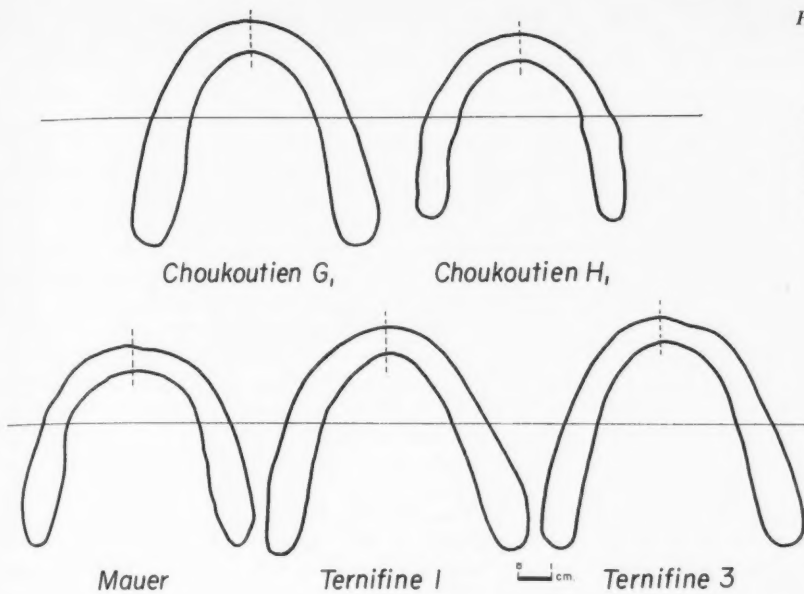


FIG. 18. Outlines of the mandibular arches of some Middle Pleistocene hominid mandibles (redrawn after Weidenreich 1936; Arambourg 1955b).

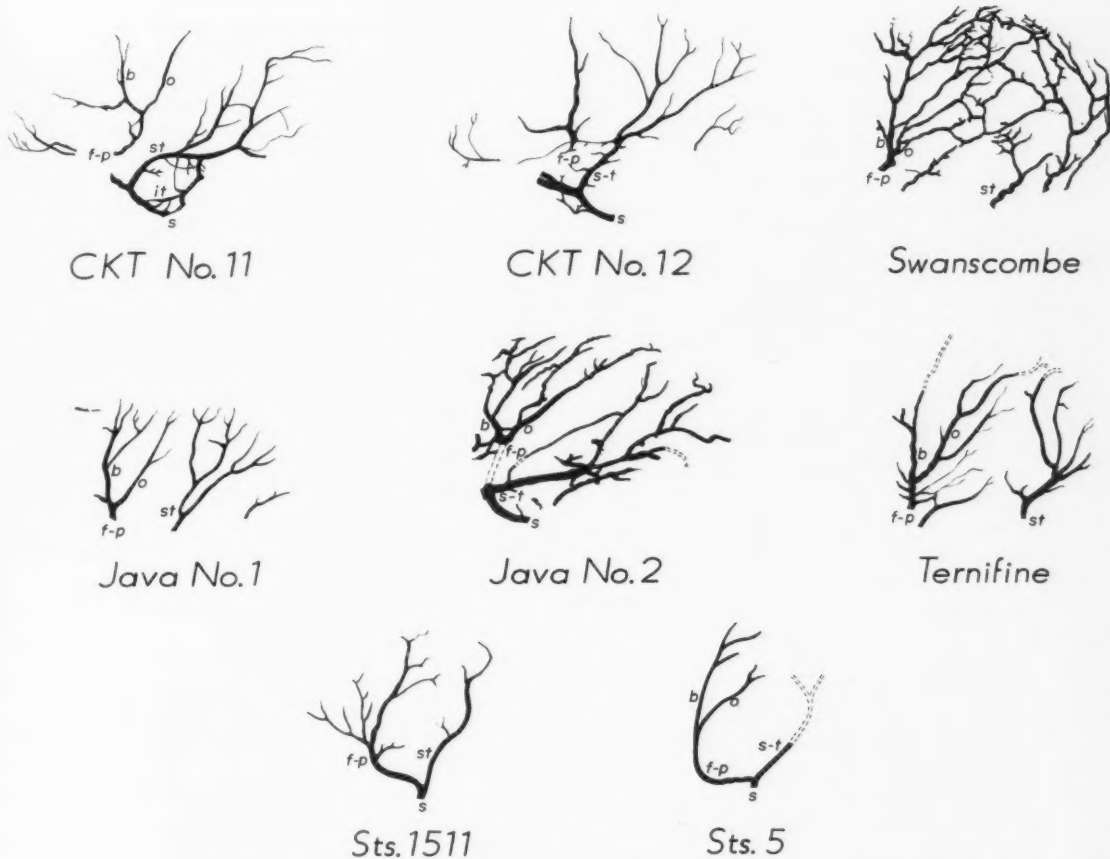


FIG. 19. Patterns of ramification of middle meningeal vessels in an australopithecine (*Australopithecus*) and in some Middle Pleistocene hominids (redrawn after Broom, Robinson, and Schepers 1950; Weidenreich

1938; Arambourg 1955d; Le Gros Clark 1938). Key to abbreviations: s = stem; fp = fronto-parietal; b = bregmatic; o = obelionic; st = superior temporal; it = inferior temporal.

A single right parietal (Arambourg 1955*d*) constitutes the only part of the vault of the Ternifine peoples found thus far. It represents a relatively young individual, the sutures being still open and the thickness of the bone corresponding approximately to that of a modern adult. The parietal curvature suggests a relatively low-vaulted skull, with the greatest transverse diameter situated below the squamous (temporoparietal) suture. The superior temporal line is quite well delineated, especially for a non-adult individual. The well-preserved endocranial surface reveals a distinct and prominent Sylvian crest, extending upward from the antero-inferior angle. The postero-inferior angle is thickened (11 mm.) into a prominent angular torus. Both these features are typical and well developed in the eastern Asian hominids (Weidenreich 1943, 1947*a*). The pattern of the middle meningeal vessels (Fig. 19) reveals an initial bifurcation before penetration into the parietal region. The anterior branch crosses the area of the Sylvian crest and ramifies into anterior (bregmatic) and median (obelionic) branches; the posterior (lower temporal) branch, comparable in size to the anterior, extends over the postero-inferior margin of the parietal, but it is scarcely ramified, and its subdivisions are minor. This basic pattern, characterized by (1) the importance of the lower temporal branch and its premature separation from the common meningeal trunk, and (2) the weak development of the anterior (bregmatic and obelionic) branches, is typical of the Choukoutien folk (Weidenreich 1938), and is found in the earlier Java specimens from the Trinil beds (Von Koenigswald 1940). This pattern is also evident in the (earlier known) endocranial casts of the australopithecines described by Schepers (in Broom and Schepers 1946). It differs rather markedly from patterns in anatomically modern peoples, in which extensions of ramifications of the median and bregmatic branches predominate, the temporal branch is reduced, and a generally more completely ramified and secondarily anastomotic pattern is characteristic. It is likely, as Weidenreich (1938) has suggested, that the former pattern was a basic feature of primitive hominids.

Certain significant differences have been noted between the dental and mandibular morphology of the Mauer and the Ternifine hominids. The former shows no close resemblance to the eastern Asian Middle Pleistocene peoples, whereas the morphology of the Ternifine group is markedly similar to the latter. Any differences are of a minor variational sort, and are at most of racial significance; thus, there are no differences between the Ternifine and Choukoutien Locality 1 people which might not be expected within a single polytypic species, populations of which were widely separated geographically. The extent of the distinctiveness in the case of the Mauer individual, unfortunately based on only a single mandible and adult dentition which is assumed to be representative of its population, is difficult to account for on these same grounds. Consequently the conclusion must be that the evolutionary history of such European people must have been quite different from that of the northwest African and eastern Asian populations. The implications of this conclusion will be considered below.

GREAT INTERGLACIAL

Europe has provided two human skulls in deposits of Great Interglacial age, from Swanscombe and from Steinheim. The Steinheim specimen (Fig. 20) is of particular importance, since not only is the cranium largely complete, but the facial skeleton is preserved as well as a premolar and six molars of the upper dentition. The right side of the Steinheim specimen is perfectly preserved, although Weinert (1936) wrongly emphasized the distortion of this side, and permits accurate reconstruction of the whole skull (cf. Berckhemer 1937). The left side is badly damaged in the fronto-sphenoidal region, and the left side of the face is broken away except for the portion of frontal with the supraorbital torus, as is the whole anterior segment of the maxilla. The anterior and middle portions of the base are excellently preserved, but the base of the occipital is broken away. A detailed description of this specimen has never appeared, although preliminary notes were published by Berckhemer (1933*b*, 1934, 1937, 1938); and, a more lengthy discussion and reconstruction were attempted by Weinert (1936) from a cast and after a brief examination of the original skull (prior to its being fully cleaned). A full description of the skull will be published by W. Gieseler (Tübingen).

The facial skeleton of the Steinheim specimen is relatively small, all sides of the facial triangle being relatively short and non-prognathous (Table 6). The suprafacial (supraorbital) torus is prominent, and separated from the forehead by a marked supraglabellar fossa; the torus is thick (22 mm.) in the midline, where a pronounced and extensive frontal sinus is developed. The torus is bipartite and curved on either side, rather than forming a continuous straight (Java man of the Trinil beds), or more arched, bar (Choukoutien people); it is thickest medially (supraciliary area), and decreases in robustness laterally (supraorbital area). The space between the orbits is very wide, and the nasal bones are raised into a pronounced saddle and distinct from the frontal bone, a deep depression being present at the nasal root. The orbits are small and semi-rectangular, being deeper (vertically) laterally than medially. The nasal aperture, although very short, is uncommonly broad, and its lateral walls project forward markedly. The infraorbital zygo-maxillary region is considerably angulated, and thus differs substantially from the mid-facial morphology of the Choukoutien people. There is an incipient depression corresponding to the position of a canine fossa, although a true fossa (in the anatomically modern sense) is not developed. The structure of the middle face of Steinheim resembles in a general way that of European early Neanderthal peoples, and approaches that of anatomically modern man; it is quite different from the specialized facial structure so characteristic of classic Neanderthal folk (Howell 1951).

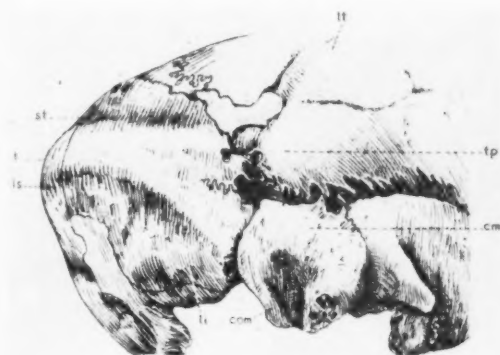
The complete upper molar dentition of this individual, a young adult, is little worn and perfectly preserved. The right premolar is also present; its crown is short (7 mm.), but wide, with well developed buccal cusp and small lingual cusp symmetrically arranged. The first molar is the largest of the series; M^3 is markedly reduced toward a sub-rounded form, with the

hypocone most affected. The crowns of the first and second molars are asymmetrically square, the mesial margin sloping backward lingually, and the distal sloping the same direction due to the prominent development of the large hypocone. The buccal cusps (paracone and metacone) are large, and the protocone is relatively reduced. These teeth are moderately (M^2) to markedly (M^1 , M^3) taurodont; and, M^1 and M^2 also show quite well-developed prismatic root formation (cf. Berckhemer 1937).

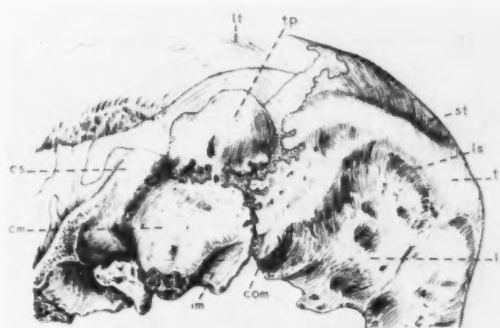
The Steinheim cranial vault is long and narrow and fairly low (highest point near bregma), and, in general, relatively small (Table 6). The cranial capacity has been variously estimated, the figure of 1070 cc. offered by Weinert (1936) being cited most frequently. However, this figure is almost surely too low, and it is much more likely that the actual value approaches 1150–1175 cc. The cranial bones are only moderately thick, considerably less so than any of the earlier or broadly contemporaneous eastern Asian peoples; the thickness approaches, but does not always attain, that of some portions of the Swanscombe specimen. The difference between the outer and inner cranial dimensions is nonetheless considerable. In contrast with the eastern Asian folk, it is due not to the development of massive cranial superstructures, but to an extraordinarily large frontal sinus (a formation that is extremely small in the Choukoutien group). The greatest vault breadth is situated rather high, at the inferior margin of the parietal, as it is in the Swanscombe specimen, rather than at the auricular

level, as in the eastern Asian peoples. Thus, in posterior view, the vault has a quadratic form with rounded margins. The frontal bone, with marked postorbital constriction, is long and low, but exhibits (as does that of the Choukoutien folk) a distinct frontal tuber some 50 mm. above the supraorbital margin. The curvature of the parietal is broken by a faint prelamdoid depression. The temporal lines are only barely delimited. The temporal squama is expanded and curved superiorly, a condition similarly present in Swanscombe; the sphenoid is in articulation with the parietal (over a distance of *c.* 9 mm.). The mastoid process is relatively small, with an open, moderately shallow mastoid incisure posterior to it. The external auditory meatus is vertically elliptic in shape, with a well-developed, vertically oriented anterior portion, separated from the glenoid cavity by a prominent thick postglenoid ridge, and a smaller but thick posterior portion; these are separated by a small, lateral vaginal ridge. The occipital bone is well-rounded, rather than angulated as in the eastern Asian Middle Pleistocene peoples, and lacks the massive occipital torus formation so characteristic

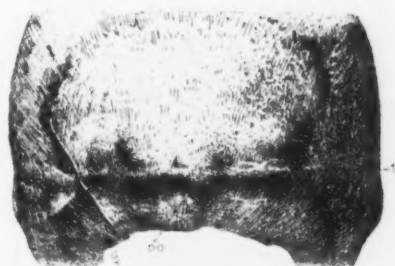
FIG. 21. Occipital torus structure in the east Asian hominid from Choukoutien and in the west European hominids from Swanscombe and Steinheim (after Weidenreich 1940). Key to abbreviations: ds = supratatorial fossa; ls = superior nuchal line; po = external occipital protuberance; t = occipital torus.



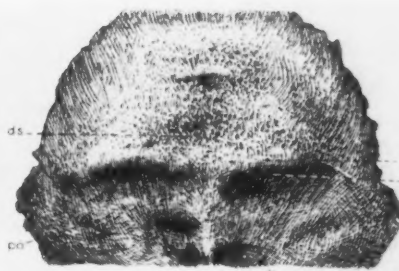
CKT 11



CKT 12



Steinheim



Swanscombe

of the latter (Weidenreich 1940, 1943). The occipital torus (Fig. 21) is low, and extends laterally as far as the asterionic region, but there is no development of the

angular torus such as in the Asian peoples. The torus is tripartite in structure, with more salient lateral segments and a wide, flattened medial portion; superiorly,

TABLE 6-A

Martin's Nos.	Calvarial Measurements	Pre-	Great Interglacial						Post-
		Java 2	Choukoutien 10	Choukoutien 11	Choukoutien 12	Choukoutien range (10, 11, 12)	Steinheim	Swanscombe	Saccopastore 1.
1(2)	Maximum length (g-op)	176.5	199	192	195.5	192-199	185	—	(181-2)
1d	Nasion-opisthocranium length (n-op)	—	194	185	192	185-194	177	—	182
3	Glabella-lambda length (g-l)	159?	186	169	174	169-186	172-4	—	(155-73)
3a	Nasion-lambda length (n-l)	—	184	166	175	166-184	167-9	—	(161-76)
4	Inner skull length	148	173	167	168	167-173	156	—	—
—	Difference between 1(2) and 4	28.5	26	25	27.5	25-27.5	29	—	—
5(1)	Nasion-opisthion length (n-o)	134?	—	145	147	145-147	(135-40)	—	135
8	Maximum (parietal) breadth (eu-eu)	131	138?	135	139?	135-139	132-3	(142)	142
9	Least frontal breadth (ft-ft)	79	89	84	91	84-91	102	—	101
9(1)	Post-orbital breadth	83?	98?	93	95	93-98	102	—	102
10	Greatest frontal breadth (co-co)	102?	110?	106	108	106-110	118-9	—	116
11	Biauricular breadth (au-au)	129?	147	143	151	143-151	116	—	125
12	Biauricular breadth (ast-ast)	120	111?	113	115	111-115	106-8	123.5?	(117)
13	Bimastoid breadth (ms-ms)	102	—	103?	—	—	93.4	—	102
17	Basi-bregmatic height (ba-b)	105?	—	rest.	—	—	(110)	125?	109
20	Auriculo-bregmatic height (po-b)	89	106	94	101.5	94-106	98	—	101
—	Opisthocranium height above n-o (proj.)	37	—	53	41	41-53	50	—	—
—	Inion height above n-o (proj.)	37	—	53	41	41-53	29	—	—
—	Distance between internal & external inion	25	38	34	35	34-38	—	15	—
24	Auriculo-bregmatic arc (po ^o po ^b)	262	310	280	280	280-310	300	—	282
25	Median sagittal arc (n ^o o)	302?	—	332	337	332-337	341-2	—	338?
26	Nasion-bregma arc (n ^o b)	107?	129	122	124	122-129	120	—	(110)?
27	Bregma-lambda arc (b ^o l)	94	113	92	102.5	92-113	107-9	115.5?	(121)
28	Lambda-opisthion arc (l ^o o)	101?	—	118	118	—	(113-4)	116	(107)
29	Nasion-bregma chord (n-b)	90?	115	106	113	106-115	(98-100)	—	105.5
30	Bregma-lambda chord (b-l)	91	106	86	91	86-106	(96-9)	107.5?	112
31	Lambda-opisthion chord (l-o)	75	—	86	86	—	(88-9)	94	87
32(1)	Frontal inclination angle I (b-n \angle n-op)	—	46.5°	42°	44°	42°-46.5°	47°	—	52°
33(lb)	Occipital inclination angle II (l-op \angle op-g)	62.5°	68°	57°	61°	57°-68°	76°	—	—
33(4)	Occipital curvature angle (l-op \angle op-o)	103°	104°?	105°	98°	98°-105°	112°	—	102°-09°
—	Cranial capacity (in cc)	775	1225	1015	1030	1015-1225	(1150-75)	(1325)	1175

a fine supratatorial sulcus differentiates it from the occipital squama; inferiorly, the superior nuchal line is fully evident. This structure, marking the level of inion, is about 18 mm. below the position of maximum cranial length (opisthocranion); in the eastern Asian peoples of the Middle Pleistocene, these points coincide. The supramastoid crest, unconnected with the torus, is only moderately developed, and terminates abruptly at the squamosal suture; a faintly depressed area above it presumably represents a supramastoid sulcus.

The Steinheim skull, although small and exhibiting a number of related primitive features, differs markedly from the crania of eastern Asian peoples of the Middle Pleistocene. These differences are fundamental rather than trivial, and include the form, thickness, and curvature of vault bones, structure of the cranial base (cf. Kramp 1936), and the development of special cranial superstructures. The preserved portions of the Swanscombe cranium (Fig. 22), representing a fairly young adult individual, bear a very close and detailed resemblance to the corresponding portions of the Stein-

heim skull. This was demonstrated some years ago by Morant (1938: 97), who noted that "as far as can be seen, the Swanscombe and Steinheim skulls were quite similar, and it is not unlikely that they represent the same Acheulian group." Thus, the real significance of the Swanscombe cranium, aside from its well-dated context and the extremely important association with an Acheulean industry, is its confirmation of the fact that this population was relatively widespread in Europe during the Great Interglacial, and that it differed considerably from broadly contemporaneous human populations in eastern Asia.

The Swanscombe parieto-occipital bones are slightly larger, and in places rather thicker (Table 6), than their counterparts in the Steinheim specimen; however, the differences are no more than might be expected within a single variable population and in individuals of different sex, the form and cranial architecture being the same (Fig. 23). Various estimates, made according to different methods, are available for the cranial capacity of this specimen (cf. Morant 1938; Breiting 1955); the most reasonable and likely figure is 1250-1300 cc., but, since the remains are incomplete, it is impossible to be precise.

TABLE 6-A, 6-B. Some dimensions of the Steinheim and Swanscombe crania with comparative figures for some east Asian Middle Pleistocene hominids.

TABLE 6-B

Martin's Nos.	Facial Skeleton Measurements	Great Interglacial		Last Interglacial	
		Choukoutien (reconst.)	Steinheim	Saccopastore 1.	Saccopastore 2.
5	Basilar length (n-ba)	105.5	(96-100)	101.5	114
40	Superior facial length (ba-pr)	114	(108-10)	(114)	117
48	Superior facial height (n-pr)	77	(74-75)	(86)	87
43	Superior facial breadth (above fnt-fnt)	121	117	118	120
43(1)	Inner biorbital breadth (fmo-fmo)	111	—	112	118
44	Biorbital breadth (ek-ek)	111	106	103	116
45	Bizygomatic breadth (zy-zy)	148	(132)	—	140
46	Maxillary breadth (zm-zm)	98?	(98-100)	—	112
48(1)	Alveolar height (ns-pr)	25	(21-4)	25.5	27
50	Anterior interorbital breadth (mf-mf)	25	—	22	25-6
51	Orbital breadth (mf)	44	41	46-47	49
52	Orbital height	36	30	(39)	38-9
54	Nasal breadth	30	(30)	31	34
55	Nasal height (n-ns)	52.5	(32)	59	59-60
60	Maxillo-alveolar length (pr-alv.)	64	59	(60)	63
61	Maxillo-alveolar breadth (ekm-ekm)	71	68	70	72
62	Palatal length (ol-sta)	52	—	53	57
63	Palatal breadth (between second molars)	39	—	40	41
72(5)	Upper facial triangle (nasion \angle)	72°	74°	75°	70°
72(5)	Upper facial triangle (prosthion \angle)	68°	65°	60°	66°
72(5)	Upper facial triangle (basion \angle)	40°	42°	46°	44°



FIG. 22. Left lateral and occipital views of the Swanscombe cranium. (Photographs courtesy of K. P. Oakley, British Museum, Natural History.)

The parietals are relatively thick, except for the obelionic and lambdoid regions, and are slightly curved with a prelamdoid depression; the length is rather small in proportion to the breadth. The slightly curved squamous margin is thickened, not sharp-edged, and the sphenoidal angle only roughly rounded and bent medially. Keith (1938/39) suggested a fronto-temporal articulation here, whereas Marston (1937) and Morant (1938) thought an epipteric bone may have been present, but the exact morphology is difficult to determine since the remains are incomplete. The transverse curvature of the parietal is of the form seen in the Steinheim specimen, and the lateral expansion of the vault reveals the same rounded quadratic shape when viewed from behind. As in the case of Steinheim, the anterior parietal breadth is reduced. The superior temporal lines, situated below the parietal tuber, indicate a

moderately large area of origin for the temporal muscle. There is no Sylvian crest development, in contrast to the massiveness of this structure in the eastern Asian peoples from Java and Choukoutien. The pattern of ramification of the middle meningeal vessels (Le Gros Clark 1938) reveals a primary bifurcation, in the middle cranial fossa, of lambdoid and bregmatic branches; in the upper parietal area, a branch is given off extending toward the obelionic region (Fig. 15). This pattern, corresponding to the type-IV category of G. Ruggeri, is extremely rare in anatomically modern peoples, and also differs from the primitive hominid pattern of the Choukoutien (Weidenreich 1938) and Ternifine (Arambourg 1955*d*) populations.

The biasterionic breadth of this specimen is considerable, and the maximum breadth was estimated by Morant to be even greater and situated markedly low

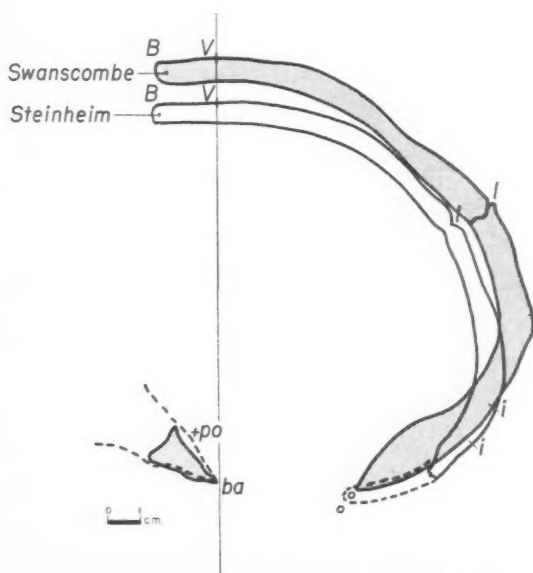


FIG. 23. Mid-sagittal sections of the Steinheim and Swanscombe parieto-occipital bones.

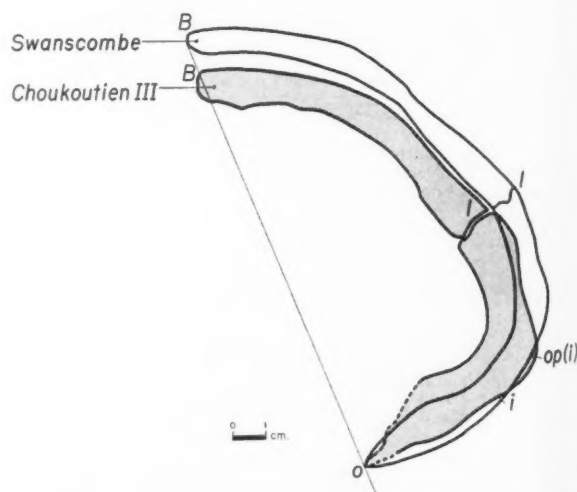


FIG. 24. Mid-sagittal sections of the Swanscombe and Choukoutien Locality I (No. III) parieto-occipital bones.

on the skull. The expanded curvature of the Swanscombe occipital resembles closely that of the Steinheim individual and contrasts markedly with the eastern Asian hominids (Fig. 24). The occipital torus is present only as a transverse, slightly curved ridge, with the lateral portions more salient than the reduced and flattened central segment; a true external occipital protuberance is absent, just as in the Steinheim specimen. The torus, slightly projecting above the depressed nuchal plane with well-developed sites of nuchal muscle attachment, is somewhat less demarcated from the occipital plane than is the case in the Steinheim specimen (Fig. 16); a triangularly shaped, widened depression in the mid-line represents the supratatorial fossa. Such minor differences are either individual variation and/or sexually determined. The mastoid angle is entirely flat with no trace of a connection with the occipital torus, although there is some thickening of this area. The cerebellar fossae are small in comparison with the cerebral fossae, and the internal occipital protuberance is situated considerably below (15 mm.) the level of the occipital torus. The sphenoidal sinus was quite extensive, judging from its marked expansion into the basi-occipital, especially since the individual was still youthful.

Certain authors (see below) have concluded that the Swanscombe cranium offers proof of the Great Interglacial age of anatomically modern man. However, it is difficult to understand this conclusion in view of the close similarity in cranial form and architecture between the Steinheim and Swanscombe specimens, a similarity that Morant called attention to, but failed to stress, in his original description of the Swanscombe cranium. This conclusion is of course meaningful if both individuals are referred to *H. sapiens*. However, Roginskii (1948) has emphasized that a number of the cranial proportions of the Swanscombe specimen are duplicated among some, especially early, Neanderthals and, correspondingly, differ from those of morphologically modern human groups. Stewart (1959) has recently noted the same similarity in the inferior projection of the masto-occipital process, suggesting a small mastoid, and resembling the Neanderthal rather than the anatomically modern conditions. Sergi (1953) and Breiting (1952, 1955) have reached essentially the same conclusion. Breiting, in a careful study of the proportions and interrelationships of cranial elements of the Swanscombe skull, has demonstrated that an anatomically modern frontal and facial region is in fact highly improbable for that individual. The preserved portions of the Swanscombe specimen indicate that this individual closely resembles in its cranial morphology the individual from Steinheim, and that both represent the same hominid variety. However, in a number of features, including (1) the shortness and flatness of the parietal, (2) the length and curvature of the occipital squama and the relative shortness and flatness of the occipital region and length of the foramen magnum, (3) the marked biasterionic breadth and reduced anterior diameter of the parietal, and (4) the moderate cranial height, both specimens deviate from the anatomically modern morphological pattern and, instead, are allied with early Neanderthal peoples.

It seems very likely that the Montmaurin mandible

(Fig. 25) should be attributed to a population like that represented by the Steinheim and Swanscombe crania. Except for a slight difference in size, it fits closely the Steinheim skull, as Vallois (1955, 1956, 1958) has noted in his preliminary descriptions of the specimen. This specimen, discovered in 1949, was recovered from the Montmaurin caves, situated in the limestone cliffs bordering Montmaurin, thirteen kilometers northwest



FIG. 25. Left lateral and occlusal views of the Montmaurin mandible (after Vallois 1958).

of Saint-Gaudens (Haute-Garonne). It was found in the lower portion of a collapsed vertical shaft (termed La Niche), the filling of which was unstratified, but contained a so-called warm fauna (mostly red deer; no reindeer), and a pre-Mousterian type of flake assemblage. Its age, based on the fauna and on geological studies by Bonifay, is either late in the Great Interglacial or within an interstadial phase of the subsequent (Saale = Riss) glaciation. The adjoining Coupe-Gorge cave (Baylac *et al.* 1950), with Micoquian and Upper Paleolithic occupation horizons, shows cold maxima interpreted as end-Riss and early Würm (Bonifay 1957), and the filling of La Niche occurred evidently during an earlier, warmer stage. The several Montmaurin sites have been known for many years. Boule (1902) and, later, Saint-Périer (1902) presented lists of an interesting warm fauna (*Rh. mercki*, *Eq. caballus*, *S. scrofa*, *Bos cf. primigenius*, *C. elaphus*, *C. capreolus*, and various carnivores including the sabretooth, *M. latidens*) collected, first from work by E. Cartailhac, from remnants of breccia adhering to cave walls.

The body of the Montmaurin mandible is very robust, in this respect resembling the Mauer specimen. However, the borders are essentially parallel, and the

lower border is broad with well-defined posterior marginal tubercle. The digastric fossae are extremely well developed, extending along the lower border to the level of the first molar. The buccal surface is swollen behind the double mental foramen. The lingual surface is raised below the mylo-hyoid line; a sub-lingual fossa is not present. The anterior symphyseal face is retreating, lacking any trace of a bony chin; the posterior face is marked by a very oblique planum, below which is a marked torus situated above the widely depressed zone in which an oblong crest represents the genial tubercles (Fig. 12). The rami are not particularly broad, considerably less so than Mauer, and the mandibular angles describe a regularly rounded, weakly angulated curve. There are low, but marked crests on both faces of the ramus, a marked triangular torus, continuous with the alveolar ridge on the lingual face, and an oblique torus on the buccal face. The large condyles, markedly long and broad with oval articular surfaces, project notably outward as in the Mauer mandible. The sigmoid notch, on the other hand, is more pronounced than in the latter specimen. The alveolar arch is parabolic in shape and markedly divergent.

The incisor, canine, and premolar teeth are missing from the specimen, but the full permanent molar series is present. The root of the canine was long and the premolar root single, judging from the sockets. The molars are large, M_3 being the largest tooth and M_2 slightly smaller than M_1 . In all the molars the bucco-lingual dimension is smaller than the mesio-distal dimension. There is no trace of a cingulum, but the molar crowns are swollen on the buccal surface. The cusps present a dryopithecine pattern, with a hypoconulid and also with a *tuberculum sextum*. The crown is considerably wrinkled on the least worn M_3 . The molar pulp cavities show a moderate degree of taurodontism, as do those of most other Middle Pleistocene hominids.

LATER MIDDLE PLEISTOCENE

Human skeletal remains from the Penultimate Glacial/Pluvial stage are extremely rare. At present, only incomplete lower and upper jaws, with portions of the mandibular and maxillary dentition, are known from Littorina Cave (Sidi Abderrahman) and from the Rabat sandstone.⁷ The Littorina Cave specimen (Arambourg and Biberson 1956) comprises a portion of the right mandibular body with three molars, and a part of the left post-symphysial region with P_1 and the alveoli of the canine and lateral incisor. The Rabat remains (Vallois 1945, 1946; cf. also Briggs 1948, 1955), representing an adolescent individual, include the lower part of a right maxilla (with incisors, canine, premolars, and first two molars), the anterior half of a mandible (with full dentition except for the unerupted M_3), and twenty-one small fragments of the cranial vault (which are impossible to reconstruct).

The body of the Littorina Cave mandible (Fig. 26) is robust, with the ventral and alveolar borders parallel. The ventral border, although rounded and thick, lacks a marginal torus; the alveolar border is also smooth and devoid of any torus development, including the lateral prominence of the buccal side, which is weakly expressed. The heavily worn P_1 is single-rooted, with a

slight longitudinal depression on the distal face (a condition found in those Choukoutien folk in which the root is not bifid). There is no true cingulum, although traces of vertical cingular folds occur on the distal and mesial borders, and the buccal face of the crown is rather swollen. The crown shape is asymmetrical, with the bucco-lingual axis oblique to the mesio-distal axis; thus, the larger buccal cusp forms the whole buccal wall, whereas the smaller lingual cusp is displaced slightly distally. The anterior fovea is small, while the posterior fovea is quite large. In all these features, the morphology of this tooth resembles closely that of the Ternifine people.

The molars, the crowns of which are quite heavily worn, are large; as in Ternifine, M_2 is the largest of the molar series. The crown of M_1 is subrectangular, with a Y5 cusp pattern, the large metaconid being in contact with the hypoconid. An anterior fovea is faintly evident between the protoconid and metaconid. M_2 is somewhat more elongated—rather elliptical—with a similar cusp pattern, except that there is a closer approach to

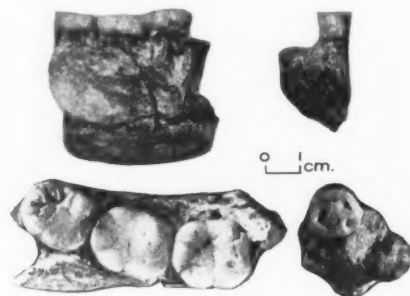


Fig. 26. Lateral and occlusal views of the Littorina Cave mandible fragments (after Arambourg and Biberson 1956).

the +5 shape, and a sixth cusp is present buccally between the entoconid and hypoconulid. M_3 , smallest of the series, reveals a Y5 pattern, probably with an additional sixth cusp; the unworn portion of its occlusal surface is covered by secondary wrinkles.

The Rabat mandible is robust and broad, with a moderately low body. The mental foramina are double, as in Ternifine and other Middle Pleistocene peoples. The relatively large digastric fossae are restricted to the ventral surface of the body. The symphysis is retreating, and on its lingual surface there is a moderate superior transverse torus; below the torus is a broad fossa, representing the site of the upper genial tubercles, whereas the lower genial tubercles are fused below as a median ridge. The incisors and canines are not arranged in an arc, but are more transversely positioned. The canines are incisiform. The lingual cusp of P_1 is relatively well developed, and the crown exhibits the characteristic asymmetry noted in the Ternifine and the Choukoutien peoples. P_2 is double-rooted with a well-developed talonid, as in the Ternifine folk. The molars are large, show traces of a buccal cingulum, and exhibit considerable taurodontism. The cusp pattern of M_1 is of the Y5 variety, with the large metaconid in contact

with the hypoconid. In M_2 , which is larger than M_1 , there is a +5 pattern and an additional sixth cusp.

The Rabat maxillary fragment exhibits considerable prognathism, lacks a mid-facial depression (canine fossa formation), and the palate is relatively large. The upper incisors show considerable development of marginal ridges, producing a shovel-shaped crown, and have pronounced marginal tubercles. The canine is large, projects slightly past the occlusal plane, and has a large cingulum on the buccal face and a marked median crest on the crown. P^1 is double-rooted and P^2 single-rooted, the crown patterns of each resembling homologous teeth of the Choukoutien folk. As in the lower dentition, M^2 is larger than M^1 , and a well-marked cingulum is present, as is basal swelling of the crown. There is a well-developed hypocone, and accessory cusps obscure the basic crown pattern; on M^1 the normal transverse ridge (paracone-protocone) is absent, and on M^2 the oblique ridge (metacone-protocone) is similarly lacking. Both these and other features are typical of the Choukoutien Locality 1 population.

In so far as preserved, the Littorina Cave mandible and dentition bear a marked resemblance to those of the Ternifine people. Moreover, as Arambourg (in Arambourg and Biberson 1956) has pointed out, there are specific dental characteristics (the dryopithecine cusp pattern, traces of sixth cusp, predominance of protoconid over metaconid, trace of a cingulum on molars and premolars, and shape and pattern of the crown of P_1) which indicate affinities with the Middle Pleistocene peoples of eastern Asia. There are also certain differences (such as narrower molars, more elliptical M_2 , and greater reduction of M_3) which must indicate geographical variation. The resemblance of the Rabat morphology to that of both the Choukoutien people and also various Neanderthals of Europe has been noted by Vallois (1945); however, he doubted whether this individual represented a member of a specifically Neanderthal group. In fact, as indicated above, the Rabat remains are of the same Middle Pleistocene group as the Littorina Cave specimen, and both are closely allied with the earlier Ternifine population.

SOME PHYLOGENETIC IMPLICATIONS

In spite of incomplete preservation and the limited number of specimens, sufficient is known of the Middle Pleistocene peoples of northwest Africa and western Europe to permit some assessment of their relationships with other broadly contemporaneous peoples elsewhere. Several important conclusions emerge from a consideration of human populations from two major blocks of the Middle Pleistocene: (1) the pre-Great Interglacial range (early Middle Pleistocene) and (2) the Great Interglacial and subsequent early phase of the Penultimate Glacial range (later Middle Pleistocene).

(1) In Europe there is no trace of the so-called "pithecanthropine" peoples so characteristic of the whole of the Middle Pleistocene of eastern Asia. In the latter area, a series of populations has been recognized from the basal (Djetis beds) and earlier (Trinil beds) Middle Pleistocene and extending into a stage that probably corresponds broadly with the European Great Interglacial (Choukoutien Locality 1). The only European

human fossil from the earlier Middle Pleistocene range of time, the Mauer mandible, is sufficiently different to be regarded tentatively as very likely specifically distinct from the eastern Asian lineage. The European evidence is admittedly tenuous, since human crania are lacking, but if the dental and mandibular morphology is indicative (as it is in the Asian populations), then this conclusion is warranted. The Ternifine people, however, in the morphology of their teeth and jaws, bear a (perhaps unexpected) close resemblance to the eastern Asian populations. Any slight differences are of probably no more than subspecific significance, and are not wholly unexpected between specifically similar, but widely separated, natural populations.

(2) No human skeletal remains are known from the Great Interglacial stage in northern Africa, but the slightly younger remains from the Littorina Cave and Rabat appear to testify to the persistence of populations like Ternifine into the earlier phases of the Penultimate Glacial/Pluvial. This is paralleled in eastern Asia by the continuation of the "pithecanthropine" lineage represented by the people of Choukoutien Locality 1.

In Europe "pithecanthropine" peoples are absent also from the Great Interglacial range. The Steinheim and Swanscombe crania, exhibiting a number of incipiently anatomically modern features, establish the fact that at that time human populations of the area differed markedly in cranial morphology from contemporaneous peoples of eastern Asia (and presumably of northwestern Africa). The evidence would suggest that two distinctive hominid lineages were differentiated within the Middle Pleistocene, one represented by eastern Asian and northwest African populations, and the other by European populations.

These lineages correspond closely to the "vertical" lines of evolutionary development to which Le Gros Clark (1955) has attributed generic status: *Pithecanthropus* and *Homo*, respectively. He states that members of the former "comprise a group whose morphological characters are held by most anthropologists to be sufficiently consistent and distinctive to justify their generic separation from *Homo*" (p. 105); and, further, that "the cranial and dental differences (as well as the even more significant contrast in cranial capacity) appear to be as well marked as those which are commonly accepted as justifying a generic distinction between gorilla and chimpanzee" (p. 106). The writer doubts that "most anthropologists" (human paleontologists) have ever expressed an opinion on this matter, other than merely accepting the existing terms of reference without examining the full taxonomic implications of the terminology. Moreover, although no clear-cut definition of a genus is possible, as it is in the case of species and species-groups (cf. Cain 1956), it is generally recognized that genera testify to the achievement of special adaptive plateaus (in S. Wright's sense), characterized by well-established behavior patterns and morphological adjustments toward definite habitats, specifiable in nature as well-delineated ecological zones. It is questionable whether such far-reaching distinctions are recognizable within the known hominids of the Middle and Upper Pleistocene.

The writer's own proclivity, and broadly in agreement with Mayr (1950) (except in the case of *Australopithecus*, which he has granted specific status within the genus *Homo*, but which is more likely generically distinct), is to reduce these to paleospecies representing phyletic lineages. The paleospecies, discussed by Cain (1956: 103; also 1954), represents "a time series of populations known (or believed) to be connected successively by descent, reproductively separate from all other forms co-existing during the same period, and sufficiently homogeneous on comparative criteria to be included under a single specific name." Simpson (1951: 289) has pointed out that "a phyletic lineage (ancestral-descendant sequence of interbreeding populations) evolving independently of others, with its own separate and unitary evolutionary role and tendencies, is a basic unit in evolution"; and that "the genetical definition [of a species] tends to equate the species with such an evolutionary unit." The morphological evidence does not appear to warrant recognition of separate genera; certainly there is complete overlap in range of variation in cranial capacity, a character to which Le Gros Clark has attached considerable importance. Nor, taking into consideration Simpson's (1954: 32-33) remarks on mammalian generic origin rates (c. five to seven million years as an approximation), has there been sufficient time for generic differentiation, even allowing for an extraordinarily rapid evolutionary rate. The original dispersal and subsequent evolution of hominids from a primitive australopithecine group, probably not unlike *Australopithecus*, most likely occurred within a single genus (*Homo*). The earliest phases within the formation of that genus are difficult to define, owing to the incomplete record. Oakley's (1951) emphasis upon tool manufacture and its use as a criterion may prove to be correct, although at least some australopithecines were tool-makers.

The eastern Asian hominids provide a classic example of phyletic evolution within a paleospecies (*H. erectus*). The detailed morphological patterns have been analyzed by Weidenreich (1941, 1943, 1946, 1947b). There is evidence of development within the lineage during the early Middle (Djetis and Trinil varieties) and the later Middle (Choukoutien variety) Pleistocene and probably into the earlier Upper (Ngandong variety) Pleistocene. The fossil record is inconclusive as to the subsequent history of the group, but it is not unlikely that the lineage became extinct prior to, or when, anatomically modern australoid peoples expanded throughout the Southeast Asian area during the later phases of the Upper Pleistocene. All the evidence available tends to confirm Movius' (1949a: 411) conclusion that "it seems very unlikely that this vast area could ever have played a vital and dynamic role in early human evolution, although very primitive forms of Early Man apparently persisted there long after types at a comparable stage of physical evolution had become extinct elsewhere."

It is a matter of considerable interest that in north-western Africa, where such persistence apparently also occurred, cultural (= industrial) transformations did take place, as evidenced by the widespread adoption in the earlier Middle Pleistocene of the Chelles-Acheul hand-ax/cleaver and associated flake traditions. In the

far easterly and southerly regions of Asia, the earlier Pre-Chelles-Acheul tradition was maintained, as the chopper/chopping-tool tradition, with only slight modification into the Upper Pleistocene (cf. Movius 1949a). The continued existence of this industrial complex, undoubtedly derived from the early African "pebble-tool" tradition the Villafranchian age of which is well established, is a striking instance of human conservatism, undoubtedly caused in large part by isolation from western Asia, Europe, and Africa. Only in certain portions of India is there any real evidence of overlap between these traditions and their industrial expressions.

The cranial morphology of the human populations of the Great Interglacial of Europe suggests a distinctive new lineage, markedly different from that of eastern Asia and northern Africa, and whose origins are still entirely unknown. Some workers, notably Vallois (1949, 1952), Heberer (1950, 1951), and also Kálin (1952), have attempted to show a primary bifurcation into distinct "neanderthal" and "*sapiens*" lines within the European hominid populations at this early date. This implies subsequent coexistence of these lineages in Europe until extinction of the terminal classic Neanderthal population by the middle phase of the Last Glacial stage (cf. Howell 1957). The essential similarity in morphology of the only two European crania of Great Interglacial age, those of Swanscombe and Steinheim, fails to confirm this interpretation. In general, and as Le Gros Clark (1955) has also recognized, the over-all morphological pattern of such early European peoples closely approaches, in certain aspects, that of the anatomically modern species *H. sapiens* (so much so, in fact, that Le Gros Clark refers the remains to that species). Whether this taxonomy is fully justifiable or not, the European populations of the Great Interglacial provide an ideal ancestral stage for the subsequent varieties of Upper Pleistocene Neanderthal peoples and the incipiently and fully anatomically modern peoples who were subsequently to replace the last "Neanderthals" during the interstadial between the Early and Main phases of the Last Glacial. This later evolutionary history of the lineage has been discussed in some detail recently by the present author (Howell 1957; also 1951, 1952) and by Breiting (1957).

The origins of these lineages are still largely a matter for future research. The fossil record leaves little doubt that the initial, basic hominid manifestation, representing new adaptations toward a bipedal ground-dwelling way of life in a new unexploited environment, was essentially African (cf. Bartholomew and Birdsall 1953). Its primary formative phases are unknown, due to the inadequacy of the hominid fossil record, but may very well have been linked with the terminal Miocene and earlier Pliocene desiccation during the Kalahari Stage which markedly affected the extent of the semi-arid central African bushy and wooded grassland. The Villafranchian australopithecines, already adapted to the upright posture and fully bipedal locomotion, and long since differentiated into two distinct (probably sub-generic) lineages, testify to the nature of this primary adaptive radiation (Howell 1959).

This radiation gave rise to primitive tool-making hominids whose dispersal by the earlier Middle Pleistocene probably extended throughout the tropical and

subtropical zones of Africa and Asia. This initial, primary human (*Homo*) dispersal probably occurred during the later Villafranchian stage, for the earliest Southeast Asian hominids associated with them, the Djetis fauna in Java, show considerable differentiation from the presumably ancestral australopithecine group. From the occurrence early in the Middle Pleistocene of both human skeletal remains and stone tools, it is clear that this dispersal was unaffected and unretarded in most areas by the major isolating factors of characteristically Pleistocene glacial climate and related vegetation zones resultant from the first major continental stage of glaciation (Elster = Cracovian = Oka).

The archaeological record would suggest that this initial dispersal was essentially African, both north and south of the Sahara, and eventually southern Asian. Evidence is lacking from the intervening western Asian zone, but distribution was presumably broadly continuous, at least originally, across the Mediterranean African-southwest Asian-Indian semi-arid grasslands, and into the then peninsular Sunda Shelf. The comparative morphology of the Ternifine and eastern Asian representatives of *H. erectus*, populations at the most western and eastern extremes of the range, tends to confirm their relationships and common origin from this primary dispersal.

It would appear, although the evidence is admittedly incomplete, that continental Europe was not penetrated by this primary dispersal. There are no traces of hominids, either skeletal remains or stone tools, in the European Villafranchian. Such evidence does not appear until well along in the earlier Middle Pleistocene. The circumstances whereby Europe was not populated earlier by man are still difficult to ascertain. It is likely that the high sea levels of the earlier (Calabrian) and later (Sicilian I) Lower Pleistocene may have been a major factor which inhibited dispersal. The Mediterranean was greatly enlarged, and the otherwise narrow water-gaps (or potential land bridges during later regressive phases of glaciation) in the western (Gibraltar) and northeastern (Bosporus, Dardanelles) reaches of the basin were submerged. It is tentatively suggested here that the primary dispersal did not pass 35°–40° N, the barriers being formed in the westerly zone by (a) the Mediterranean basin, and (b) the Taurus-Zagros mountain chains; in the easterly zone, the northern limit presumably did not exceed, or in places attain, 30° N, the barriers being formed by the great Hindu-Kush-Karakorum-Himalayan arc. However, in the latter regions there is clear evidence of the presence of man at the end of the earlier Middle Pleistocene (at Locality 13, Choukoutien) and more complete evidence later from the Great Interglacial (Locality 1), both proving distribution as far as 40° N.

A variety of evidence indicates hominid penetration north of latitude 40°, into the temperate European continent, only well along in the earlier Middle Pleistocene. This northward expansion in hominid distribution coincides in time approximately with the maximum lowering of sea levels during the Romanian regression (cf. Fig. 1), coincident with the first major Scandinavian glaciation, which extended into southern Britain and central Europe as far as latitudes 51°–52°. Such evidence as there is from that time, including the

Mauer mandible and sporadic assemblages of an Abbevillian industry, seems to be of peoples different from those representing the primary dispersal. It is (difficultly) suggested that new technical refinements and additions to human tool-making capabilities, including the establishment of the Chelles-Acheul tradition, but probably also others which are unknown due to incompleteness of the record, re-enforced the effectiveness of such a dispersal into a previously unoccupied zone. The source of this expansion is still unknown; the central-eastern African region is a reasonable probability.⁸ At any rate, and most important, there is no evidence at present to indicate an eastern Asian center. It is necessary to emphasize that the extent of this initial occupation of Europe by man must have been relatively slight, at least judging from the relative paucity of early Chelles-Acheul assemblages compared with sub-Saharan Africa. However, for the subsequent Great Interglacial stage, there is every indication of broadened and intensified occupation in the course of the Acheulean and, in some regions, other non-hand-ax industries (Clactonian).

It is at this later time that Europe reveals clear evidence of a lineage distinct from that of *H. erectus*. However, the origins of this lineage are still unknown, and there is a real problem as to relationships with the first Middle Pleistocene populations of Europe, fossil remains of which are represented only by the Mauer mandible. It is impossible to arrive at any solution to the problem until either mandibles of the Steinheim-Swanscombe people, or a cranium of the Mauer people, can be discovered. The Montmaurin mandible is of some interest in this regard since its morphology is in some respects like that of the Mauer mandible, in other respects like that of early Neanderthal peoples. Tentatively, the most economical hypothesis is that Mauer was merely an early representative of the same lineage. The major climatic amelioration which brought on the Great Interglacial undoubtedly permitted a major expansion of populations of gathering and hunting peoples into previously restricted or unavailable biotopes; but, the extent to which this represented only intra-continental expansion and shiftings, as opposed to more extensive movements of extra-European peoples, is impossible to ascertain from existing evidence.

There has been a tendency among certain workers to deny speciation within the Pleistocene evolution of the hominids. This was the opinion of Weidenreich (1943, 1946), and it was accepted and expanded upon by Dobzhansky (1944: 261-62), who stated that "all the phylogenetic transformations within the *Hominidae* were always taking place within a single genetic system, a species consisting of geographically, but not reproductively, isolated races." The same point has been made by Mayr (1950: 112), who concluded that "all the available evidence can be interpreted as indicating that in spite of much geographical variation, never more than one species of man existed on the earth at any one time." The genetical definition of species, as "actually or potentially interbreeding natural populations which are reproductively isolated from other such groups" (Mayr 1949: 371), cannot be directly applied to pale-

ontological species, but, as Simpson (1951: 286) has noted, "actual or potential interbreeding is continuity and reproductive isolation is discontinuity." Thus, such taxonomy is arbitrary, in Simpson's terms, since the hominid fossil record of the Middle Pleistocene reveals morphological discontinuities, and the forms "are placed in a single group although essential discontinuity is indicated." Moreover, this general point of view fails to take into consideration the extent of various isolating mechanisms operative on Pleistocene human populations, in the same manner as on other mammals, although human cultural capabilities undoubtedly

served as a buffering agent. Factors of isolation, about which very considerable is known for the Upper Pleistocene, must have played a very considerable role in the distribution of such early peoples, whose cultural capacities and capabilities for adaptation to varied Middle Pleistocene biotopes were relatively restricted. The hominid fossil record indicates how extensive such isolation must have been within the Middle Pleistocene. It is essential that in the study of human evolutionary problems in the future, paleoanthropologists take into account more fully the whole matter of distributions and environmental adaptations.

Notes

1. The writer is deeply grateful to a number of colleagues whose cooperation has made this paper possible. Dr. K. P. Oakley (British Museum, Natural History, London) made available the Swanscombe cranial remains. He also accompanied the author on a visit to the Barnfield pit at Swanscombe. Prof. C. Arambourg (Museum National d'Histoire Naturelle, Paris) made available the Ternifine and Sidi Abderahman human remains. Prof. H. V. Vallois (Institut de Paléontologie Humaine, Paris) permitted the author to examine the human remains from Rabat and Montmaurin. Prof. W. Gieseler (Universität Tübingen, Tübingen) permitted the author to examine the Steinheim skull. Dr. K. D. Adam (Naturhistorisches Museum, Stuttgart) accompanied the author on a visit to the pits at Steinheim, and has also discussed with the author certain problems of Pleistocene faunas, their interpretation and correlation. Similarly, certain problems of the Pleistocene paleoanthropology of Morocco have been discussed with my colleague P. Biberson (Musée de l'Homme, Paris). The Mauer mandible was studied at the Geologisch-Palaeontologisches Institut, Universität Heidelberg, in 1956, and the author is grateful to the staff there for their assistance. The writer is also grateful to the Wenner-Gren Foundation for Anthropological Research, Inc. (New York), for grants-in-aid which made possible a study tour in sub-Saharan Africa in 1954, and another in Europe in the Summer of 1956. In Africa, Dr. J. T. Robinson (Transvaal Museum, Pretoria) and Prof. R. A. Dart (Medical School, University of the Witwatersrand, Johannesburg) generously made available for study all the australopithecine skeletal material.

2. The Cromer Forest Bed, overlying the Weybourne Crag (in places), is a complex three-fold formation, composed of Lower and Upper Freshwater Beds—both of which are discontinuous,

variable in facies, and often not preserved—and the practically continuous Middle or Estuarine Bed (= Forest Bed *sensu strictu*). The fauna is clearly mixed (cf. Zeuner 1937). Many of the fauna collections were made years ago, and it is no simple matter to unravel the particular provenance of the specimens, since different "Forest Bed" localities preserve different portions of the Forest Bed and hence different faunas (cf. Azzaroli 1951, 1953). There is pretty clearly both a later Villafranchian fauna, probably derived from the shelly Weybourne Crag (and basal Freshwater Bed), and a Middle Pleistocene assemblage, probably derived from the Upper Freshwater Bed, which closely resembled the later Great Interglacial assemblages of early Drenthian age, such as Swanscombe. However, the fauna of the Forest Bed *sensu strictu* is of intermediate age, comparable with the so-called "preglacial" St. Prestian fauna. In view of the geological evidence, it is difficult to agree with Azzaroli's (1953) conclusion that the two later (post-Villafranchian) faunas are both of Great Interglacial age.

3. The Jockgrim fauna, studied first by Freudenberg (1909, 1911) and later in greater detail by Soergel (1925; also 1912, 1923), is derived from a series of clay horizons (underlain and overlain by gravels and sands) exposed in pits in a low terrace along the left bank of the Rhine River, near Karlsruhe. The section studied in detail by Schwegeler (1935; also Thürrach 1899) reveals seven clayey loam levels, totaling some four to six meters in thickness, and broken in the middle by an erosional disconformity. It is capped by the eroded remnant of a lignite horizon with deciduous forest pollen (frequent oak, hazel, spruce, and alder; infrequent fir and pine; rare maple, linden, willow, and larch; notable is the presence of hemlock and the Asian wing-nut *Pteryocarya*). Kuss (1955) has recently shown that the mammalian fossils are found throughout the clay horizons in three different pits; in contrast to Schwegeler, Soergel, and Adam, he believes the as-

semblage is a faunal unity and covers a relatively short span of time. This fauna (= lower series of Adam) is characterized by *El. meridionalis-trogotherii* (straight-tusked elephant is known from the gravelly sands that unconformably overlie the lignitiferous level), *B. prisus*, rare deer (*C. elaphus*, *C. capreolus*), *Rh. etruscus*, *H. amphibius*, and *T. cuvieri*; also known are recent beaver (*C. fiber*), very rare moose (*A. latifrons*), giant fallow deer (*Megaceros verticornis*), *C. neschersensis*, *U. deningeri* (= *arctos*), *Desmana*, and *Emys*, but their position in the profile is uncertain.

4. The Süssenborn assemblage (Soergel 1926, 1936, 1939b, 1941; also Wust 1900) is found in gravels suggesting at least incipient periglacial conditions in Thuringia, and is basically a cool-steppe fauna (Soergel 1924, 1939a). This fauna (Kalke 1954) is characterized by abundant steppe elephant (*El. trogontherii*), horse (mostly *Eq. süßenbornensis*, 24%; also, *Eq. aff. hemionus*), grassland-loving bison (*B. prisus*, 17%), a variety of deer and elk including large-antlered forms (*Megaceros*, 20%; *Alces*, 5%) as well as roe (*C. capreolus*, 7%) and red deer (*C. elaphus*, 5%), fairly numerous rhino (*Rh. etruscus*, 9%), some beaver (both *T. cuvieri* and *C. fiber*, 4%), and rare wild boar (*S. scrofa*, 1%); both tundra reindeer (*Rangifer arcticus*, 4-5 individuals) and musk-ox (*Ovibos moschatus*, 1-2 individuals) are also present, but in very low frequency, as are various large (*Epimachairodus*, *H. crocuta* and *H. brevirostris*, *Canis mosbachensis*, *U. arctos deningeri*) and small (*Mustela*, *Lutra*, *Meles*) carnivores and other small mammals (including *Spermophilus*).

The main (II) Mosbach fauna (Schroeder 1898; Soergel 1923) is very similar in composition, but contains (c. 10%) both straight-tusked (*El. antiquus*) and much more frequent (c. 90%) steppe (*El. trogontherii*) elephants (Soergel 1916, also 1912; Schmidgen 1927), frequent horse (*Eq. mosbachensis*), rhinoceros (*Rh. etruscus*, *Rh. merckii*) (Schroeder 1903), and several additional large and small carnivores

(Von Reichenau 1906, 1910); there are also small mammals, including water voles (*A. mosbachensis*, *A. greeni*) and mice (*Microtus*, *Pitymys*) (Heller 1933; also Schmidtgen 1911).

A slightly worn, sub-ovate hand ax, typologically perhaps Middle Acheulean, has been found at Mosbach in the floor of the Bogger pit (Kutsch 1953). This is very likely derived from a remnant of an interglacial deposit yielding *El. trogontherii-primigenius*, interbedded between the earlier Mosbach gravels and the overlying Last Glacial loess complex. Hence the hand ax is presumably of Great Interglacial (Hoxnian) age.

5. The Abbevillian industry, often regarded as of "First Interglacial" age (cf. Zeuner 1952), might be considered to antedate the Mauer mandible. This is, in fact, not the case, as an examination of the most typical occurrence of this industry, in the Somme River valley at the Porte du Bois, near Abbeville (Commont 1910; Breuil 1939), will indicate. The Abbevillian assemblage, found in association with a typical early Middle Pleistocene fauna (which includes *El. meridionalis-trogontherii*, *Rh. etruscus*, *Rh. merckii*, *Hippopotamus* sp., *S. scrofa*, *Equus* sp., *C. elaphus*, *C. capreolus*, *B. priscus*, *Hyaena* sp., *M. latidens*, *Ursus* sp., *T. cuvieri*, etc.), has been found in a whitish marl with sandy horizons at the base of the High (40 meters) Terrace, underlain by an ancient gravel capped by marly and shelly sand. This marl, deposited under conditions of deep-water sedimentation, was deeply channelled during a subsequent phase of low sea level. The channels were later filled with gravels and sands (containing Acheulean), aggraded during a time of marine transgression corresponding to the Tyrrhenian 1 stage of the Great Interglacial. The erosion of the channels must have occurred during the later phase of the Romanian regression, and thus at a time corresponding to the maximum extension of the Elster Glaciation. The underlying marl, and the Abbevillian, is thus quite clearly of pre-Elster date, and very probably has a relative age corresponding broadly with the Mauer Sands. The Plateau Gravels and main High Terrace of the Somme have long been thought to be devoid of humanly-flaked stone artifacts. However, some traces of human occupation are recorded (by F. Bordes and H. Breuil, unpublished) from the c. 50–55 meters lower High Terrace. Most recently Agache and Bourdier (1959) have reported flint flakes, some trimmed and retouched as implements, and having a porcellanized appearance (due to fire?), from gravels of the upper High Terrace (+ 60–65 meters) at Montières (near Amiens).

6. In several recent, very stimulating papers, Kurtén (1956, 1957a, b) has drawn attention to the ecological replacement in the Pleistocene of the giant hyena (*H. brevisrostris*) by the spotted hyena (*Crocota crocuta*). This replacement is well-recorded at Choukoutien Locality 1 (Pei 1934), where only the former species (*H. b. sinensis*) is present in the lower sandy brecciated horizons (Zone II), and only the latter species (*C. c. ultima*) is present in the upper ashy, travertine horizons (Zone I). It is also instanced, though less clearly, at Süssenborn, where both *H. b. brevisrostris* and *C. c. spelaea* are recorded, and in a number of faunal assemblages referred to the Forest Bed series, and hence of presumed Cromerian interglacial age. Kurtén, on carefully reasoned evidence, regards the replacement as having been roughly simultaneous in western Europe, eastern Asia, and southern Africa, and thus dates a number of such sites, like Choukoutien Locality 1, Kromdraai, Swartkrans (where *C. c. ultra* occurs), to the Cromerian stage. The question of "whether this European replacement can be correlated with the East Asian" seems to him justified since "it seems that the species evolved in India from *C. sivalensis* [recorded with *H. b. neglecta* in the Pinjra zone of the Upper Siwaliks] and spread from there. . . ." It is necessary, however, to point out that Süssenborn is later early Middle Pleistocene (= end-Mindel of the Alpine succession) in age, and the replacement in Europe is at least post-Cromerian (*sensu strictu*). Neither at Mauer nor at Mosbach is *Crocota* in evidence, although *H. perrieri* is characteristic. Moreover, there is a real question as to whether the Norfolk faunal localities, referred to as contemporaneous with the Cromer Forest Bed, are indeed contemporaneous; the present writer believes them to be later (Mindel) in age. It is of course altogether possible, on other grounds, that the Swartkrans-Kromdraai localities are of Cromerian age, but one would still wish for a better understanding of the Villafranchian and, especially, Pliocene hyaenids of Africa before excluding them from *Crocota crocuta* ancestry.

7. Since this was written, Vallois and Roche (1958) have announced the discovery of human remains from Contrebandiers Cave at Témara, a few kilometers southwest of Rabat. The cave is cut into a cliff of Ouljian age, and the remains were found in remnants of breccia adhering to the walls, all that remains of the first infilling of the cave. The specimen, consisting of a nearly

complete body of a mandible with most of the left, and bits of the right, ramus, and full dentition, dates from the early Upper Pleistocene. It does not particularly resemble the earlier Sidi Abderahman or Rabat specimens, although there are some very general similarities, but seems more likely to represent a member of a North African early Neanderthal group.

8. Aside from the Villafranchian australopithecines, the Lower and Middle Pleistocene of sub-Saharan Africa has still to provide hominid skeletal remains of much use in solving the problems discussed here. However, it is necessary to mention briefly two occurrences that are suggestive and have a bearing on these problems:

(a) The breccias bearing australopithecines at Swartkrans, of either later Villafranchian (Howell 1955) or early Middle Pleistocene (Oakley 1954) age, provide clear-cut, though fragmentary, evidence of co-existence of two distinct hominids: one a large australopithecine (*Paranthropus*), and another (termed "*Telanthropus*") which is certainly different. The latter, represented by the type mandible with six molars and a first premolar (Sk 15 = No. I) (Broom and Robinson 1949, 1952), another fragment of mandible with the first two molars (Sk 45 = No. II) (Broom and Robinson 1950, 1952), and a fragment of maxilla including some heavily worn or broken premolars (Sk 80 = No. III) (Robinson 1953), is still too poorly known to determine its exact affinities. From a careful study of the original specimens, as well as from the published descriptions (esp. Broom and Robinson 1952; Robinson 1953: 477), it is clear that Robinson is completely justified in his statement that these remains differ "in so many respects from those of *P. crassidens*, without any intermediate specimens, that these forms could not have been members of the same population even though they lived simultaneously in the same area." There are no specific detailed resemblances of these specimens with the eastern Asian hominids of the *H. erectus* group; however, some features of the dentition as well as of mandibular morphology are not unlike those found in the Mauer individual. While it is possible to state (negatively) that the former is the case, it is not possible, due to the fragmentary preservation and general lack of material, to be more positive about either the morphology of this form or its phylogenetic affinities. Nevertheless, merely its discovery and the proof of co-existence with the most recent australo-

pithecine (*Paranthropus*) is of great importance in further understanding of the dispersal of the genus *Homo* and of the relationships of the latter to *Australopithecus* and the species of the latter radiation.

(b) The only human remains from sub-Saharan Africa of earlier Middle Pleistocene age are two deciduous teeth from a Chellean stage-1 living site (BK II) in Bed II at Olduvai Gorge in northern Tanganyika. One specimen, a left lower milk canine, is very heavily worn and provides little useful information. The other, which may be an upper deciduous molar, but is identified by Leakey (1958) as a left m_2 , is well preserved and more useful for comparative purposes. This scarcely worn specimen is extremely large-crowned (length 15 mm.; breadth 14 mm.) and exceeds in size its homologue in australopithecines. There are six main cusps, three buccal and three lingual, with a large accessory cusp and traces of cingulum. The pattern is somewhat unique, but there are general points of resemblance both with australopithecines and with the Choukoutien hominid (*H. erectus*).

References Cited

- ADAM, K. D. 1952. Die altpleistocänen Säugetierfaunen Südwestdeutschlands. *Neues Jahrbuch für Geologie und Paläontologie, Monatshefte*, 5:229-36.
- . 1953. Die Bedeutung der altpleistocänen Säugetier-Faunen Südwestdeutschlands für die Gliederung des Eiszeitalters. *Geologica Bavarica* 19:357-63.
- . 1954a. Die Mittelpleistozän Faunen von Steinheim an der Murr (Württemberg). *Quaternaria* 1:131-44.
- . 1954b. Die zeitliche Stellung der Urmenschen-Fundschicht von Steinheim an der Murr innerhalb des Pleistozäns. *Eiszeitalter und Gegenwart* 4/5:18-21.
- AGACHE, R., and F. BOURDIER. 1959. Découverte de silex apparemment taillés associés à un équidé archaïque de type villafranchien dans la haute terrasse supérieure de la Somme. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 248:439-42.
- ALIMEN, H. 1955. *Préhistoire de l'Afrique*. 578 pp. Paris: N. Boubée et C^{ie}.
- ARAMBOURG, C. 1938. *Mammifères fossiles du Maroc*. Mémoires de la Société des Sciences Naturelles du Maroc 46. 74 pp.
- . 1949. Les gisements de vertébrés villafranchiens de l'Afrique du Nord. *Bulletin de la Société Géologique de France, sér. 5*, 29:195-203.
- . 1952. *Le paléontologie des vertébrés en Afrique du Nord française*. XIX^e Congrès Géologique International, Monographie Régionales, hors sér. 63 pp.
- . 1954a. L'*Atlanthropus* de Ternifine. *Libya* 2:425-39.
- . 1954b. L'*Atlanthropus* de Ternifine, un chaînon complémentaire de l'ascendance humaine fabriquait des bifaces-chelléens. *La Nature* 3235:401-404.
- . 1954c. L'hominin fossile de Ternifine (Algérie). *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 239:893-95.
- . 1955a. A recent discovery in human paleontology: *Atlanthropus* de Ternifine (Algérie). *American Journal of Physical Anthropology*, n.s., 13:191-202.
- . 1955b. Une découverte récente en paléontologie humaine, l'*Atlanthropus* de Ternifine (Algérie). *Quaternaria* 2:5-13.
- . 1955c. Une nouvelle mandibule "d'*Atlanthropus*" au gisement de Ternifine. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 241:895-97.
- . 1955d. Le pariétal de "l'*Atlanthropus mauritanicus*." *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 241: 980-82.
- . 1956. Une III^{ème} mandibule d' "*Atlanthropus*" découverte à Ternifine. *Quaternaria* 3:1-4.
- ARAMBOURG, C., and P. BIBERSON. 1955. Découverte des vestiges humains acheuléens dans la carrière de Sidi Abd-cr-rahman, près Casablanca. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 240:1661-63.
- . 1956. The fossil human remains from the palaeolithic site of Sidi Abderrahman. *American Journal of Physical Anthropology*, n.s., 14:467-89.
- ARAMBOURG, C., and R. HOFSTETTER. 1954. Découverte en Afrique du Nord de restes humains du Paléolithique inférieur. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 239:72-74.
- AZZAROLI, A. 1951. The geological age of the Cromer Forest Bed. *Proceedings of the Prehistoric Society*, n.s., 17:168-70.
- . 1953. *The deer of the Weybourn Crag and Cromer Forest Bed of Norfolk*. Bulletin of the British Museum [Natural History], Geology, 2. 96 pp.
- BADEN-POWELL, D. F. W. 1948. The chalky boulder clays of Norfolk and Suffolk. *Geological Magazine* 85:279-96.
- . 1951. The age of interglacial deposits at Swanscombe. *Geological Magazine* 88:344-54.
- BADEN-POWELL, D. F. W., and J. R. MOIR. 1942. On a new Palaeolithic industry from the Norfolk coast. *Geological Magazine* 79:209-19.
- BALOUT, L. 1955. *Préhistoire de l'Afrique du Nord. Essai de chronologie*. 544 pp. Paris: Arts et Métiers Graphiques.
- BALOUT, L., and J. TIXIER. 1957. L'Acheuléen de Ternifine. *Congrès préhistorique de France, Comptes Rendus, XVI^e session, Poitiers-Angoulême, 1956*, 214-18.
- BARTHOLOMEW, G. A., JR., and J. B. BIRDSELL. 1953. Ecology and the protohominids. *American Anthropologist* 55: 481-98.
- BAYLAC, P., et al. 1950. Découvertes récentes dans les grottes de Montmaurin (Haute-Garonne). *L'Anthropologie* 54: 262-71.
- BECKSMANN, E. 1950. "Die Fundstelle des *Homo heidelbergensis* in ihrer erdgeschichtlichen Bedingtheit," in *Ur- und Frühgeschichte als Historische Wissenschaft (Ernst-Wahle Festschrift)*, pp. 241-58. Heidelberg: C. Winter Verlag.
- BECKSMANN, E., and W. RICHTER. 1939. *Die ehemalige Neckarschlinge am Ohrberg bei Eberbach in der oberpliocänen Entwicklung des südlichen Odenwaldes*. Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, 6. 94 pp.
- BERCKHEMER, F. 1925. Eine Riesenhirschtange a. d. diluvialen Schottern von Steinheim a. d. Murr. *Jahreshefte der Verein für vaterländische Naturkunde in Württemberg* 81:99-108.
- . 1927a. Neue Funde von Resten eiszeitlichen Löwe aus Württemberg. *Jahreshefte der Verein für vaterländische Naturkunde in Württemberg* 83:75-76.
- . 1927b. *Buffelus murrensis* n. sp. *Jahreshefte der Verein für vaterländische Naturkunde in Württemberg* 83:146-58.
- . 1928a. Ein Buffelfund a. d. diluvialen Schottern von Steinheim a. d. Murr. *Paläontologische Zeitschrift* 10: 64-67.
- . 1928b. Fund eines Riesenhirschschadels mit vollst. erhält. Geweih. *Aus der Heimat* 41:140-45.
- . 1929. Bericht über die Tägung der Paläont.-Gesellschaft in Stuttgart und Tübingen. Exkursion nach Steinheim a. d. Murr. *Paläontologische Zeitschrift* 2:188-89.
- . 1930. 'Der Waldelefant' von Steinheim a. d. Murr. *Aus der Heimat* 43:331-37.
- . 1933a. Die Wirbeltierfunde aus Schottern von Steinheim a. d. Murr. *Jahresberichte und Mitteilungen der oberrheinischer geologischer Verein, n.f.*, 22:89-103.
- . 1933b. Ein Urmenschenschädel aus dem diluvialen Schottern von Steinheim a. d. Murr. *Anthropologischer Anzeiger* 10:318-21.
- . 1934. Der Steinheimer Urmensch und die Tierwelt seines Lebensgebietes. *Aus der Heimat* 47:101-15.
- . 1937. Bemerkungen zu H. Weinerts Abhandlung "Der Urmenschenschädel von Steinheim." *Verhandlungen der Gesellschaft für Physische Anthropologie* 2:49-58.
- . 1938. Vorweisung des Steinheimer-Schädels in Original. *Verhandlungen der Deutschen Gesellschaft für Rassenforschung* 9:190-92.
- . 1940. Über die Riesenhirsche von Steinheim an der Murr. *Jahreshefte der Verein für vaterländische Naturkunde in Württemberg* 96:63-88.
- BIBERSON, P. 1954. Le hachereau dans l'Acheuléen du Maroc atlantique. *Libya* 2:39-61.
- . 1955. Nouvelles observation sur le Quaternaire côtier de la région de Casablanca (Maroc). *Quaternaria* 2:109-49.
- . 1956. Le gisement de l' "*Atlanthropus*" de Sidi Abderrahman (Casablanca). *Bulletin d'Archéologie Marocaine* 1:38-92.
- BIBERSON, P., and G. LECOINTRE. 1956. Progrès dans la connaissance du Quaternaire de Casablanca (Maroc). *Bulletin de la Société Géologique de France, sér. 6*, 6:855-66.
- BONIFAY, E. 1956. Les sédiments détritiques grossiers dans les remplissages des grottes. Méthode d'étude morphologique et statistique. *L'Anthropologie* 60:447-61.
- BOSWELL, P. G. H. 1931. The stratigraphy of the glacial deposits of East Anglia in relation to early man. *Proceedings of the Geologists Association* 42:87-111.
- . 1936. Problems of the borderland of archaeology and geology in Britain. *Proceedings of the Prehistoric Society*, n.s., 2:149-60.
- . 1958. The Cromer Forest Bed: Pre-glacial or Interglacial? *Nature* 181:1087-88.
- BOULE, M. 1902. La caverne à ossements de Montmaurin (Haute-Garonne). *L'Anthropologie* 13:305-19.
- BOURCART, J. 1943. La géologie du Quaternaire du Maroc. *Revue Scientifique* 81: 311-36. Paris.
- BOURCART, J., G. CHOUBERT, and J. MARCAIS. 1949. Sur la stratigraphie du Quaternaire côtier à Rabat. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 228:108-109.
- BREITINGER, E. 1952. Zur Morphologie und systematischer Stellung des Schädel-

fragmentes von Swanscombe. *Homo* 3: 131-33.

- , 1955. Das Schädelfragment von Swanscombe und des "Praesapiensproblem." *Mitteilungen der Anthropologischen Gesellschaft in Wien* 84/85:1-45.
- , 1957. Zur phyletischen Evolution von *Homo sapiens*. *Anthropologischer Anzeiger* 21:62-83.
- BREUIL, H. 1932. Les industries à éclats du Paléolithique ancien, I. Le Clactonien. *Préhistoire* 1:125-90.
- , 1939. Le vrai niveau de l'industrie abbevillienne de la Porte du Bois (Abbeville). *L'Anthropologie* 49:13-34.
- BRIGGS, L. C. 1948. Les hommes paléolithique de Rabat et Tangier: Étude comparative. *Bulletin de la Société d'Histoire naturelle de l'Afrique du Nord* 39:105-14.
- , 1955. *The stone age races of north-west Africa*. Bulletin of The American School of Prehistoric Research, No. 18. 98 pp.
- BROOM, R., and J. T. ROBINSON. 1949. A new type of fossil man. *Nature* 164:322-23.
- , 1950. Man contemporaneous with the Swarthkrans ape-man. *American Journal of Physical Anthropology*, n.s., 8: 151-56.
- , 1952. *Swarthkrans ape man*, *Paranthropus crassidens*. Transvaal Museum, Memoir No. 6. 123 pp. Pretoria.
- BROOM, R., and G. W. H. SCHEPERS. 1946. *The South African fossil ape-men: The australopithecinae*. Transvaal Museum, Memoir No. 2. 272 pp. Pretoria.
- BROOM, R., J. T. ROBINSON, and G. W. H. SCHEPERS. 1950. *Sterkfontein ape-man, Plesianthropus*. Transvaal Museum, Memoir No. 4. 117 pp. Pretoria.
- CAIN, A. J. 1954. *Animal species and their evolution*. 190 pp. London: Hutchinson's University Library.
- , 1956. The genus in evolutionary theory. *Systematic Zoology* 5:97-109.
- CHANDLER, R. H. 1930. On the Clactonian industry at Swanscombe. *Proceedings of the Prehistoric Society East Anglia* 6:70-116.
- , 1931, 1932, 1935. The Clactonian industry and report of field meeting at Swanscombe. I, II, III. *Proceedings of the Geologists Association* 42:175-77; 43:70-72; 45:43-45.
- CHOURBERT, G. 1955. Note sur la géologie des terrains récents des Doukkala. *Notes de la Service Géologique du Maroc* 13:1-46.
- , 1956. Les rapports entre les formations marines et continentales quaternaires. *Actes du IV Congrès International du Quaternaire, Rome-Pise, 1953*, 2:576-90.
- , 1957. Essai de corrélation entre les cycles marins et continentaux du Pléistocène au Maroc. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 245:1066-69.
- CHOURBERT, G., and J. MARÇAIS. 1947. Le Quaternaire des environs de Rabat et l'âge de l'homme de Rabat. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 224:1645-47.
- COMMONT, V. 1910. Les gisements paléolithique d'Abbeville. Stratigraphie, faune, industrie humaine. Situation par rapport aux terrasses fluviales de la Somme. *Annales de la Société Géologique du Nord* 39:249-93.
- DALLONI, M. 1940. Notes sur la classification du Pliocène supérieur et du Quaternaire de l'Algérie. *Bulletin de la Société de Géographie et d'Archéologie de la Province d'Oran* 61:1-36.
- , 1954. Sur quelques problèmes du Quaternaire méditerranéen. *Bulletin de la Société d'Histoire naturelle de l'Afrique du Nord* 45:134-69.
- DEECKE, W. 1926. *Der Zusammenhang von Flusslauf und Tektonik, dargestellt an den Flüssen S-W-Deutschland*. Fortschritte der Geologie und Paläontologie 16. 74 pp. Berlin.
- DEWEY, H. 1932. The Palaeolithic deposits of the lower Thames valley. *Quarterly Journal of the Geological Society* 88: 35-54. London.
- DIETRICH, W. O. 1929. Über die Einbettung eines Urs in Steinheimer Schotter. *Jahreshefte der Verein für vaterländische Naturkunde in Württemberg* 85:43-46.
- DORZHANSKY, T. 1944. On species and races of living and fossil man. *American Journal of Physical Anthropology*, n.s., 2: 251-65.
- FRAAS, E. 1914. Elefantenzähne von Steinheim a. d. Murr. *Jahreshefte der Verein für vaterländische Naturkunde in Württemberg* 70:34-36.
- FREISING, H. 1952. Die Deckschichten der eiszeitlichen Flusskiese von Steinheim an der Murr (Landkreis Ludwigsberg). *Jahreshefte der geologische Abteilung der Württembergischen statistischen Landesamtes* 2:66-72.
- FREUDENBERG, W. 1909. Das Diluvialprofil von Jockgrim in der Pfalz. *Beichte über die Versammlungen der oberrheinischer geologischer Verein, 42 Versammlung (Heidelberg) 1909*:65-68.
- , 1911. Beiträge zur Gliederung des Quartärs von Weinheim a. d. B., Mauer b. Heidelberg, Jockgrim i.d. Pfalz u. a. m. und seine Bedeutung für den Bau der oberrheinischen Tiefebene. *Notizblatt die Verein für Erdkunde und grossherzogthums hessische geologische Landesanstalt zu Darmstadt* 4:76-149.
- , 1914. Die Säugetiere aus des älteren Quartärs von Mitteleuropa, mit besonderer Berücksichtigung der Fauna von Hundsheim in Niederösterreich nebst Ausführungen über verwandte Formen von Mauer, Mosbach, Cromer und anderen Fundorten. *Geologische und paläontologische Abhandlungen*, n.f., 12: 453-672 (as a separate, 219 pp.).
- GEYER, D. 1910. Zur Molluskenfauna der Sande von Mauer. *Berichte über die Versammlung der oberrheinischer geologischer Verein, 43 Versammlung (Bad Dürkheim)*.
- , 1913. Beiträge zur Kenntnis des Quartärs im Schwaben. *Jahreshefte der Verein für vaterländische Naturkunde in Württemberg* 69:277-302.
- GIGOUT, M. 1957. L'Ouljien dans le cadre du Tyrrhénien. *Bulletin de la Société Géologique de France*, sér. 6, 7:385-400.
- GIGOUT, M., and Y. GOURINARD. 1956. Essai de corrélation du Quaternaire marin entre les côtes atlantique du Maroc et méditerranéenne d'Oranie. *Actes du IV Congrès International du Quaternaire, Rome-Pise, 1953*, 2:593-99.
- GIGOUT, M., and R. RAYNAL. 1957. Corrélation des phénomènes marines et continentaux dans le Quaternaire marocain. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 244:2528-31.
- HARMER, F. W. 1902. A sketch of the later Tertiary history of East Anglia. *Proceedings of the Geologists Association* 17: 416-79.
- HEBERER, G. 1950. "Das Präsapient-Problem." in *Moderne Biologie (Festschrift für H. Nachtshiem)*, ed. H. GRÜNEBERG and W. ULRICH, pp. 131-62. Berlin: Peters Verlag.
- , 1951. Grundlinien in der pleistocänen Entfaltungsgeschichte der Euhominien. *Quartär* 5:50-78.
- HELLER, F. 1933. Die Wühlmäuse der Mosbacher Sande. *Notizblatt die Verein für Erdkunde und grossherzogthums hessische geologische Landesanstalt zu Darmstadt* 5:108-16.
- , 1934. Wühlmausreste aus den altdiluvialen Sanden von Mauer a. d. Elsenz. *Jahresberichte und Mitteilungen der oberrheinischer geologischer Verein*, n.f., 23:139-44.
- , 1936. Eine oberpliocäne Wirbeltierfauna aus Rheinhessen. *Neues Jahrbuch für Mineralogie*, 76:99-160.
- , 1939. *Neue Säugetierfunde aus dem altdiluvialen Sanden von Mauer a. d. Elsenz*. Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, No. 8. 23 pp.
- , 1949. *Ursus (Plionarctos) stehlini* Kretzoi, der kleine Bär aus den altdiluvialen Sanden von Mauer-Bammatal und Mainz-Wiesbaden. *Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse*, No. 11:451-508 (as a separate, 60 pp.).
- HOOIJER, D. A. 1952. Fossil mammals and the Plio-Pleistocene boundary in Java. *Proceedings Koninklijke Nederlandse Akademie van Wetenschappen te Amsterdam*, ser. B, 55:436-43.
- , 1957. The correlation of fossil mammalian faunas and the Plio-Pleistocene boundary in Java. *Proceedings Koninklijke Nederlandse Akademie van Wetenschappen te Amsterdam*, ser. B, 60:1-10.
- HOOIJER, D. A., and E. H. COLBERT. 1951. A note on the Plio-Pleistocene boundary in the Siwalik series of India and in Java. *American Journal of Science* 249: 533-38.
- HOWELL, F. C. 1951. The place of Neanderthal man in human evolution. *American Journal of Physical Anthropology*, n.s., 9:379-416.
- , 1952. Pleistocene glacial ecology and the evolution of "classic Neanderthal" man. *Southwestern Journal of Anthropology* 8:377-410.
- , 1955. The age of the australopithecines of southern Africa. *American Journal of Physical Anthropology*, n.s., 13: 635-61.
- , 1957. The evolutionary significance of variation and varieties of "Neanderthal" man. *Quarterly Review of Biology* 32:330-47.
- , 1959. The Villafranchian and human origins. *Science* 130:831-44.
- JARANOFF, D. 1936. L'évolution morphologique du Maroc atlantique pendant le Pliocène et le Quaternaire. *Revue de Géographie physique et de Géologie dynamique* 9:301-32.
- KÄLIN, J. 1952. "Die älteste Menschenreste und ihre stammesgeschichtliche Bedeutung." in *Historia Mundi, I, Frühe Menschheit* (ed. F. VALJAVEC), pp. 33-98. Bern: Francke Verlag.
- KALKE, D. 1954. Die Fauna der altpleistozänen Ilmkiese von Süßenborn bei Weimar. *Urania* 17:141-46.
- KEITH, A. 1938-39. A resurvey of the anatomical features of the Piltdown skull with some observations on the recently discovered Swanscombe skull, Parts I and

- II. *Journal of Anatomy* 73:155-85, 234-54.
- KING, W. B. R. 1955. The Pleistocene epoch in England. *Quarterly Journal of the Geological Society* 111:187-208. London.
- KING, W. B. R., and K. P. OAKLEY. 1936. The Pleistocene succession in the lower parts of the Thames valley. *Proceedings of the Prehistoric Society*, n.s., 2:52-76.
- KOENIGSWALD, G. H. R. VON. 1940. *Neue Pithecanthropus-Funde 1936-1938: Ein Beitrag zur Kenntnis der Praehominiden*. Dienst von den Mijnbouw in Nederlandsch-Indië, Wetenschappelijke Mededeelingen, No. 28. 232 pp.
- KOLB, A. 1931. Zur Morphologie des Nordkraichgaues und des angrenzenden kleinen Odenwaldes. *Badische Geographische Abhandlungen* 7:1-99. Karlsruhe.
- KRAMP, P. 1936. Die topographischen Verhältnisse der menschlichen Schädelbasis mit besonderen Berücksichtigung des Fossilfunde von La Chapelle-aux-Saints, Steinheim a. d. Murr und Broken Hill. *Anthropologischer Anzeiger* 12: 112-30.
- KURTÉN, B. 1956. *The status and affinities of Hyæna sinensis Owen and Hyæna ultima matsumoto*. American Museum Novitates, No. 1764. 48 pp.
- . 1957a. Mammal migrations, Cenozoic stratigraphy and the age of Peking man and the australopithecines. *Journal of Paleontology* 31:215-27.
- . 1957b. The bears and hyænas of the interglacials. *Quaternaria* 4:69-81.
- KUSS, S. E. 1955. Die stratigraphische Verteilung der altpleistocänen Fauna aus dem Tonlager von Jockgrim in der Pfalz. *Beiträge zur naturkundlichen Forschung in Südwestdeutschland* 14:93-100.
- KUTSCH, F. 1953. Acheuléen-Faustkeil aus den Mosbach Sanden. *Festschrift der Römisch-germanischen Zentralmuseums Mainz zum Feier seines hundertjährigen Bestehens, 1952*, 1:54-56. Mainz: Hans Klumbach.
- LE GROS CLARK, W. E. 1938. General features of the Swanscombe skull bones: The endocranial cast. *Journal of the Royal Anthropological Institute* 68:58-67.
- . 1955. *The fossil evidence for human evolution*. 181 pp. Chicago: University of Chicago Press.
- LEAKEY, L. S. B. 1951. *Olduvai Gorge: A report on the evolution of the hand-axe culture in Beds I-IV*. 164 pp. Cambridge, Eng.: University Press.
- . 1958. Recent discoveries at Olduvai Gorge, Tanganyika. *Nature* 181:1099-1103.
- LECOINTRE, G. 1952. *Recherches sur le Néogène et le Quaternaire marins de la côte atlantique du Maroc*, I. Stratigraphie [198 pp.], II. Paléontologie [174 pp.]. Notes et Mémoires du Service Géologique Marocain, No. 99.
- . 1953. Le Quaternaire de Rabat-Casablanca et ses relations avec la préhistoire. *Libya* 1:13-15.
- LEHMANN, U. 1949. Der Ur in Diluvium Deutschlands und seine Verbreitung. *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie* 90 (B):163-266.
- MARCAIS, J. 1934. Découverte de restes humains fossiles dans les grès Quaternaires de Rabat (Maroc). *L'Anthropologie* 44: 579-83.
- MARSTON, A. T. 1937. The Swanscombe skull. *Journal of the Royal Anthropological Institute* 67:339-406.
- MAYR, E. 1949. The species concept: Semantics versus semantics. *Evolution* 3: 371-72.
- . 1950. Taxonomic categories in fossil hominids. *Cold Spring Harbor Symposia on Quantitative Biology* 15 (Origin and Evolution of Man):109-18.
- MORANT, G. M. 1938. The form of the Swanscombe skull. *Journal of the Royal Anthropological Institute* 68:67-97.
- MOVIUS, H. L., JR. 1944. *Early man and Pleistocene stratigraphy in southern and eastern Asia*. Papers, Peabody Museum of American Archaeology and Ethnology, Harvard University, 19 (3). 125 pp.
- . 1949a. The Lower Palaeolithic cultures of southern and eastern Asia. *Transactions of the American Philosophical Society* 38:329-420.
- . 1949b. Villafranchian stratigraphy in southern and western Europe. *Journal of Geology* 57:380-412.
- MÜLLER-BECK, H. J. 1957. Paläolithische Kulturen und Pleistozäne Stratigraphie in Süddeutschland. *Eiszeitalter und Gegenwart* 8:116-40.
- NEUVILLE, R., and A. RUHLMANN. 1941. *La place du Paléolithique ancien dans le Quaternaire marocain*. Institut des Hautes-Etudes Marocaines, Collection Hesperis, 8. 156 pp.
- . 1942. L'âge de l'homme fossile de Rabat. *Bulletin de la Société d'Anthropologie de Paris*, sér. 9, 3:74-88.
- NEWTON, E. T. 1882. *The vertebrata of the Forest Bed series of Norfolk and Suffolk*. Memoirs of the Geological Survey of Great Britain. 143 pp. London.
- OAKLEY, K. P. 1951. The fluorine-dating method. *Yearbook of Physical Anthropology* [for 1949] 5:44-52.
- . 1952. Swanscombe man. *Proceedings of the Geologists Association, London*, 63:271-300.
- . 1953. "Dating fossil human remains," in *Anthropology Today* (ed. A. L. KROEBER), pp. 43-56. Chicago: University of Chicago Press.
- . 1954. Dating of the Australopithecinae of Africa. *American Journal of Physical Anthropology*, n.s., 12:9-27.
- . 1957a. Tools makyth man. *Antiquity* 31:199-209.
- . 1957b. Stratigraphical age of the Swanscombe skull. *American Journal of Physical Anthropology*, n.s., 15:253-60.
- OAKLEY, K. P. and M. LEAKEY. 1938. Report on excavations at Jaywick Sands, Essex (1934), with some observations on the Clactonian industry, and on the fauna and geological significance of the Clacton channel. *Proceedings of the Prehistoric Society*, n.s., 3:217-60.
- OSBORN, H. F. 1922. Pliocene (Tertiary) and early Pleistocene (Quaternary) mammalia of East Anglia, Great Britain, in relation to the appearance of man. *Geological Magazine* 59:433-41.
- PEI, W. C. 1934. On the Carnivora from Locality 1 of Choukoutien. *Paleontologia Sinica*, ser. C, 8, No. 1. 116 pp.
- PIKE, K., and H. GODWIN. 1953. The interglacial at Clacton-on-Sea, Essex. *Quarterly Journal of the Geological Society, London*, 108:261-72.
- POMEL, A. 1879. Ossements d'éléphants et d'hippopotames découvertes dans une station préhistorique de la plaine d'Eghris. *Bulletin de la Société Géologique de France*, sér. 9, 18:44-51.
- . 1893-98. *Monographie des vertébrés fossiles de l'Algérie*. Publications du Service de la Carte Géologique de l'Algérie.
- POMEL, A. and P. PALLARY. 1888. La station quaternaire de Palikao. *Matériaux pour l'Histoire Primitive et Naturelle de l'Homme* 22:221-32.
- REICHENAU, W. VON. 1906. Beiträge zur näheren Kenntnis der Carnivora aus den Sanden von Mauer und Mosbach. *Abhandlungen der grossherzogthums hesische geologische Landesanstalt zu Darmstadt* 4:202-85.
- . 1910. Revision der Mosbacher Säugetierfauna, zugleich Richtigerstellung der Aufstellung in meinen "Beitrag zur näheren Kenntnis der Carnivoren aus den Sanden von Mauer und Mosbach." *Notizblatt die Verein für Erdkunde und grossherzogthums geologische Landesanstalt zu Darmstadt*, ser. IV, 31:118-34.
- REID, C. 1890. *The Pliocene deposits of Britain*. Memoirs of the Geological Survey of Britain. 326 pp. London.
- REID, C., and E. M. REID. 1908. On the preglacial flora of Britain. *Journal of the Linnean Society, London*, 38:206-27.
- REIN, U. 1955. Die pollenstratigraphische Gliederung des Pleistozäns in Nordwestdeutschland. I. Die Pollenstratigraphie im älteren Pleistozän. *Eiszeitalter und Gegenwart* 6:16-24.
- ROBINSON, J. T. 1953. *Telanthropus* and its phylogenetic significance. *American Journal of Physical Anthropology*, n.s., 11:445-501.
- . 1956. *The dentition of the Australopithecinae*. Transvaal Museum, Memoir No. 9. 179 pp. Pretoria.
- RODE, K. 1933. Über die Bärenreste von Steinheim an der Murr. *Zeitschrift für Säugetierkunde* 8:73-86.
- ROGINSKII, I. I. 1948. Zur Frage nach dem Alter des heutigen Menschentyps. (Die Stellung des Schädels von Swanscombe im Hominidensystem.) *Sowjetwissenschaft, Gesellschaftswissenschaftliche Abteilung* 1:114-22.
- RÜGER, L. 1928a. Beiträge zur Kenntnis der altdiluvialen Faunen von Mauer a. d. Elsenz und Eberbach am Neckar. *Carnivora und Rodentia. Geologische und paläontologische Abhandlungen*, n.f., 16: 197-232.
- . 1928b. *Geologische Führer durch Heidelbergs Umgebung*. 351 pp. Heidelberg: C. Winter.
- . 1929. *Machairodus latidens Owen aus den altdiluvialen Sanden von Mauer a. d. Elsenz*. Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch - Naturwissenschaftliche Klasse, No. 7. 6 pp.
- . 1931. Ein Lebensbild von Mauer. *Badische geologische Abhandlungen* 3: 121-36.
- RUHLMANN, A. 1945a. L'homme fossile de Rabat. *Hesperis* 32:35-50.
- . 1945b. *Le paléolithique marocain: Nouvelle esquisse d'une étude d'ensemble*. Publication Service d'Antiquités de Maroc, fasc. 7. 103 pp.
- RUST, A. 1956a. Über neue Artefactfunde aus der Heidelberg Stufe. *Eiszeitalter und Gegenwart* 7:179-92.
- . 1956b. *Artefakte aus der Zeit des Homo heidelbergensis in Süd- und Norddeutschland*. 43 pp., 40 pls. Bonn: Rudolph Habelt.
- SAINT-PÉRIER, R. DE. 1922. Nouvelles recherches dans la caverne de Montmaurin (Haute-Garonne). *L'Anthropologie* 32:193-202.
- SAINTY, J. E. 1929. The problems of the Crag. *Proceedings of the Prehistoric Society of East Anglia* 6:57-75.
- SALOMON, W. 1924. *Die Intensitäten aluvialer und diluvialer Vorgänge und ihre Einwirkung auf die pliocäne Rumpflache des Kraichgaues und Odenwaldes*. Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch - Naturwissenschaftliche Klasse, No. 3. 38 pp.
- . 1926. Die Rehbockschen Wasserwalzen und ihre Bedeutung für die Ero-

- sion und Akkumulation. *Geologische Rundschau* 17:418-27.
- SAUER, A. 1898. Erläuterung zu Blatt Neckargemünd (Nr. 32). Geologischen Spezialkarte Baden. Heidelberg.
- . 1909. Exkursion in der Mauerer Sande und in die altdiluviale Neckarschlinge des Eisental. *Berichte über die Versammlungen der oberrheinischer geologischer Verein*, 42. Versammlung (Heidelberg).
- SCHMIDTGEN, O. 1911. Über Reste von Wühlmäusen aus dem Mosbacher Sand. *Notizblatt der Verein für Erdkunde und grossherzogthums geologische Landesanstalt zu Darmstadt* 4:185-93.
- . 1927. Über *Elephas trogontherii* Pohlig. *Paläontologische Zeitschrift* 8: 62-70.
- . 1929. Knochenartefakte ? aus den Mosbacher Sanden. *Jahrbücher der Nassauischer Verein für Naturkunde* 80:1-6. Wiesbaden.
- . 1931. Weitere Knochenartefakte aus dem Mosbacher Sand. *Jahrbücher der Nassauischer Verein für Naturkunde* 81: 123-29.
- SCHMITTENNER, H. 1922. Die Entstehung des Neckartales im Odenwald. *Zeitschrift der Gesellschaft für Erdkunde zu Berlin* 3/4:126-42.
- SCHOETENSACK, O. 1908. *Der Unterkiefer des Homo heidelbergensis aus dem Sanden von Mauer bei Heidelberg: Ein Beitrag zur Paläontologie des Menschen*. 67 pp. Leipzig: Wilhelm Engelmann.
- SCHREUDER, A. 1950. Microtinae from the Middle Gravels of Swanscombe. *Annals and Magazine of Natural History*, ser. 12, 3:629-35.
- SCHROEDER, H. 1898. Revision der Mosbacher Säugetierfauna. *Jahrbücher der Nassauischer Verein für Naturkunde* 51: 211-30.
- . 1903. Wirbeltierfauna des Mosbacher Sandes. I. Gattung *Rhinoceros*. *Abhandlungen der königlich preussischen geologischen Landesanstalt*, n.f., 18:1-143.
- SCHWEGELER, E. 1935. Das Diluvium von Jockgrim in der Rheinpfalz und seine Stellung innerhalb des oberrheinischen Diluviums. *Schriften der Geologisch-Paläontologischen Institut der Universität Kiel* 3. 101 pp.
- SERGI, S. 1953. Die profanerantropi di Swanscombe e di Fontéchevade. *Rendiconti di Accademia Nazionale dei Lincei, Classe di Scienze fisiche, matematiche e naturali*, ser. 8, 14:601-608.
- SIMPSON, G. G. 1951. The species concept. *Evolution* 5:285-92.
- . 1954. *The major features of evolution*. 434 pp. New York: Columbia University Press.
- SMITH, R. A., and H. DEWEY. 1913. Stratification at Swanscombe: Report on excavations made on behalf of the British Museum and H. M. Geological Survey. *Archaeologia* 64:177-204.
- . 1914. The high terrace of the Thames: Report on excavations made on behalf of the British Museum and H. M. Geological Survey in 1913. *Archaeologia* 65:187-212.
- SOERGER, W. 1911. Die Pferde aus der Schotterterrasse von Steinheim a. d. Murr. *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie* 32 B-B:740-61.
- . 1912. *Elephas trogontherii* Pohlig und *Elephas antiquus* Falc. *Paläontographica* 60:1-114.
- . 1916. Die pliocänen Proboscider der Mosbacher Sande. *Jahresberichte und Mitteilungen der oberrheinischer geologischer Verein*, n.f., 5:155-61.
- . 1923. Die diluvialen Säugetiere Badens. I. Alteres und mittleres Diluvium. *Mitteilungen der grossherzoglich badischen geologischen Landesanstalt, Heidelberg* 9:1-254.
- . 1924. Die diluvialen Terrassen der Ilm und ihre Bedeutung für die Gliederung des Eiszeitalters. 79 pp. Jena: G. Fischer.
- . 1925. Die Säugetierfauna des altdiluvialen Tonlagers von Jockgrim in der Pfalz. *Zeitschrift der deutschen geologischen Gesellschaft* 77:405-38.
- . 1926. Der Bär von Süssenborn. Ein Beitrag zur näheren Kenntnis der diluvialen Bären. *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie*, ser. B, 54 B-B:115-56.
- . 1928. Das geologische Alter des Homo heidelbergensis. *Paläontologische Zeitschrift* 10:217-33.
- . 1933. Die geologische Entwicklung der Neckarschlinge von Mauer: Ein Exkursionsbericht. *Paläontologische Zeitschrift* 15:322-41.
- . 1936. *Hyaena brevirostris* Aymard und *Hyaena ex. aff. crocuta* Erlx. aus den Kiesen von Süssenborn. *Zeitschrift der deutschen geologischen Gesellschaft* 88:525-39.
- . 1939a. Das diluviale System. 1. Die geologischen Grundlagen der Vollgliederung des Eiszeitalters. *Fortschritte der Geologie und Paläontologie* 12 (Heft 39). 292 pp.
- . 1939b. Unter welchen klimatischen Verhältnissen lebten zur Bildungszeit der altdiluvialen Kiesen von Süssenborn *Rangifer*, *Ovibos* und *Elephas trogontherii* in mittel Deutschland? *Zeitschrift der deutschen geologischen Gesellschaft* 91:828-35.
- . 1941. Rentiere des Deutschen Alt- und Mitteldiluviums. *Paläontologische Zeitschrift* 22:387-420.
- STAESCHE, K. 1941. Nashörner der Gattung *Dicerorhinus* aus dem Diluvium Württembergs. *Abhandlungen der Reichsst. für Bodenforschung* 200:7-148. Berlin.
- STEWART, T. D. 1959. Indirect evidence of the primitiveness of the Swanscombe skull. Paper presented at 28th Annual Meeting, American Association of Physical Anthropologists, Madison, Wisconsin, U.S.A.
- SWANSCOMBE COMMITTEE. 1938. Report on the Swanscombe skull. Prepared by the Swanscombe Committee of the Royal Anthropological Institute. *Journal of the Royal Anthropological Institute* 68:17-98.
- THÜRACH, H. 1899. Über die Gliederung und Lagerung des Quartärs in der pfälzischen Rheinebene. *Zeitschrift der deutschen geologischen Gesellschaft* 51: 96-97.
- . 1909. *Erläuterung zu Blatt Heidelberg (Nr. 23)*. Geologische Spezialkarte des grossherzogthums Baden, herausgegeben von der grossherzoglich badischen geologischen Landesanstalt. 2. Aufl. Heidelberg.
- TOMMASINI, P. 1883. Gisement chelléen de Ternifine. *Bulletin de la Société d'Anthropologie de Paris*, sér. 3, 6:426-29.
- TREACHER, M. S., W. J. ARKELL, and K. P. OAKLEY. 1948. On the ancient channel between Caversham and Henley, Oxfordshire, and its contained flint implements. *Proceedings of the Prehistoric Society* 14:126-54.
- VALLOIS, H. V. 1945. L'homme fossile de Rabat. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 221:598-600.
- . 1946. L'homme fossile de Rabat. *La Nature* 3110:121-22.
- . 1949. L'origine de l'*Homo sapiens*. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 228:149-51.
- . 1952. Monophyletism and polyphyletism in man. *South African Journal of Science* 49:69-79.
- . 1955. La mandibule humaine pré-moustérienne de Montmaurin. *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 240:1577-79.
- . 1956. The pre-Mousterian human mandible from Montmaurin. *American Journal of Physical Anthropology*, n. s., 14:319-23.
- . 1958. "La mandibule préneandertalienne de Montmaurin," in *Mélanges Pittard*, pp. 395-98. Brive: Imprimerie Chastresse et C^{ie}.
- VALLOIS, H. V., and J. ROCHE. 1958. La mandibule acheuléenne de Témara (Maroc). *Comptes Rendus des Séances de l'Académie des Sciences, Paris*, 246:3113-16.
- VAUFREY, R. 1931. Les progrès de la paléontologie humaine en Allemagne. *L'Anthropologie* 41:517-51.
- . 1955. *Préhistoire de l'Afrique. Tome I. Maghreb*. Publications de l'Institut des Hautes-Etudes de Tunis 4. 458 pp.
- VLERK, I. M. VAN DER. 1950. "Correlation between the Plio-Pleistocene deposits in East Anglia and in The Netherlands," in *International Geological Congress, Report of the 18th Session, Great Britain 1948, Proceedings of Section H (The Pliocene-Pleistocene Boundary)*, pp. 101-106.
- . 1953. The stratigraphy of the Pleistocene of The Netherlands. *Proceedings Koninklijke Nederlandsche Akademie van Wetenschappen te Amsterdam*, ser. B, 56:34-44.
- . 1955. The significance of interglacials for the stratigraphy of the Pleistocene. *Quaternaria* 2:35-43.
- . 1956. The importance of the use of local subdivisions of the Pleistocene. *Actes du IV Congrès International du Quaternaire, Rome-Pise, 1953*, 2:871-74.
- VLERK, I. M. VAN DER, and F. FLORSCHUTZ. 1953. The palaeontological base of the Pleistocene in the Netherlands. *Proceedings Koninklijke Nederlandsche Akademie van Wetenschappen, Naturkunde*, 1st Reeks, Deel 20(2):1-58.
- VOELCKER, I. 1929. *Machairodus latidens* Owen aus den altdiluvialen Sanden von Mauer a. d. Elsenz. *Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse*, No. 7. 6 pp.
- . 1930. *Felis issiodorensis* Croizat von Mauer a. d. Elsenz. *Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse*, No. 12. 8 pp.
- . 1931. *Hippopotamus amphibius* von Mauer a. d. Elsenz. *Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse*, No. 3. 6 pp.
- . 1933a. Ein Knochenartefakt ? von Mauer a. d. Elsenz. *Centralblatt für Mineralogie*, B, 2:107-10.
- . 1933b. Knochenartefakte aus dem Altdiluvium des Neckars. *Verhandlungen der naturhistorisch-medizinischer Verein, Heidelberg*, n.f., 17:327-31.
- WAGNER, G. 1929a. Zur Geologie der wichtigsten Fundstellen diluvialer Säugetiere

- im Deutschland. *Paläontologische Zeitschrift* 11:194-96.
- . 1929b. *Junge Krustenbewegungen in Landschaftsbilde Süddeutschlands*. Öhringen: F. Rau.
- . 1934. Der Fundort des Steinheimer Urmenschen. *Aus der Heimat* 47:97-101.
- . 1950. *Einführung in die Erd- und Landschaftsgeschichte mit besonderer Berücksichtigung Süddeutschlands*. 2 vermehrte Aufl. Öhringen: Hohenloheischen Buchhandlung.
- WARREN, S. H. 1923. The *Elephas antiquus* bed of Clacton-on-Sea. *Quarterly Journal of the Geological Society, London*, 79: 606-34.
- . 1924. The elephant bed of Clacton-on-Sea. *Essex Naturalist* 21:32-40.
- . 1932. The Palaeolithic industries of the Clacton and Dovercourt districts. *Essex Naturalist* 24:1-29.
- . 1951. The Clacton flint industry: A new interpretation. *Proceedings of the Geologists Association* 62:107-35.
- . 1955. The Clacton (Essex) channel deposits. *Quarterly Journal of the Geological Society, London*, 111:283-307.
- WEIDENREICH, F. 1934. Das Menschenkinn und seine Entstehung. *Ergebnisse der Anatomie und Entwicklungsgeschichte*, 31:124.
- . 1936. *The mandibles of Sinanthropus pekinensis: A comparative study*. *Palaeontologia Sinica*, ser. D, 7, No. 4. 162 pp.
- . 1937. *The dentition of Sinanthropus pekinensis: A comparative odontography of the hominids*. *Palaeontologia Sinica*, n.s. D, No. 1 (whole ser. No. 101). 108 pp. (Text), 121 pp. (Atlas).
- . 1938. *The ramification of the middle meningeal artery in fossil hominids and its bearing upon phylogenetic problems*. *Palaeontologia Sinica*, n.s. D, No. 3 (whole ser. No. 110). 16 pp.
- . 1940. The torus occipitalis and related structures and their transformation in the course of human evolution. *Bulletin of the Geological Society, China*, 19:450-558.
- . 1941. The brain and its role in the phylogenetic transformation of the human skull. *Transactions of the American Philosophical Society*, n.s., 31:321-442.
- . 1943. The skull of *Sinanthropus pekinensis: A comparative study of a primitive hominid skull*. *Palaeontologia Sinica*, n.s. D, No. 10 (whole ser. No. 127). 484 pp.
- . 1945. *Giant early man from Java and South China*. *Anthropological Papers*, American Museum of Natural History, 40. 134 pp.
- . 1946. *Apes, giants and man*. 122 pp. Chicago: University of Chicago Press.
- . 1947a. Some particulars of skull and brain of early hominids and their bearing on the problem of the relationship between man and the anthropoids. *American Journal of Physical Anthropology*, n.s., 5:387-427.
- . 1947b. The trend of human evolution. *Evolution* 1:221-36.
- WEINERT, H. 1936. Der Urmenschenschädel von Steinheim. *Zeitschrift für Morphologie und Anthropologie* 35: 463-518.
- WEST, R. G. 1955. The glaciations and interglacials of East Anglia: A summary and discussion of recent research. *Quaternaria* 2:45-52.
- . 1956. The Quaternary deposits at Hoxne, Suffolk. *Philosophical Transactions of the Royal Society of London*, ser. B, 239 (No. 665): 265-356.
- . 1958. The Pleistocene epoch in East Anglia. *Journal of Glaciology* 3:211-16.
- WEST, R. G., and J. J. DONNER. 1956. The glaciations of East Anglia and the East Midlands: A differentiation based on stone-orientation measurements of the tills. *Quarterly Journal of the Geological Society, London*, 112:69-91.
- WEST, R. G., and C. M. B. MCBURNEY. 1954. The Quaternary deposits at Hoxne, Suffolk, and their archaeology. *Proceedings of the Prehistoric Society* 20:131-54.
- WILSER, J. L. 1937. *Beziehungen des Flussverlaufes und der Gefällskurve des Neckars zur Schichtenlagerung am Südrand des Odenwaldes*. Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, No. 1. 16 pp.
- WOLDSTEDT, P. 1949. Das Vereisungsgebiet der Britischen Inseln und seine Beziehungen zum festländischen Pleistozän. *Geologische Jahrbuch* 65:621-40.
- . 1950. *Norddeutschland und angrenzende Gebiet im Eiszeitalter*. 464 pp. Stuttgart: K. F. Koehler Verlag.
- . 1954-8. *Das Eiszeitalter. Grundlinien einer Geologie des Quartärs*. 2 Aufl. 2 Bd. 374, 438 pp. Stuttgart: F. Enke Verlag.
- WOOLDRIDGE, S. W. 1938. The glaciation of the London basin and the evolution of the Lower Thames drainage system. *Quarterly Journal of the Geological Society, London*, 94:627-67.
- . 1957. Some aspects of the physiography of the Thames valley in relation to the Ice Age and early man. *Proceedings of the Prehistoric Society* 23:1-19.
- WOOLDRIDGE, S. W., and D. L. LINTON. 1955. *Structure, surface and drainage in southeast England*. 176 pp. London: George Philip and Son Ltd.
- WURM, A. 1912a. Beiträge zur Kenntnis der diluvialen Säugetierfauna von Mauer a. d. Elsenz (bei Heidelberg). I. *Felis leo fossilis*. *Jahresberichte und Mitteilungen der oberrheinischer geologischer Verein*, n.f., 2:58-61.
- . 1912b. *Das Rhinoceros der Sande von Mauer bei Heidelberg*. Sitzungsberichte der Heidelberger Akademie der Wissenschaft, Mathematisch-Naturwissenschaftliche Klasse, B, No. 4. 4 pp.
- . 1912c. Über *Rhinoceros etruscus* Falc. von Mauer a. d. Elsenz (bei Heidelberg). *Verhandlungen der Naturhistorisch-Medizinischer Verein, Heidelberg*, n.f., 12:1-62.
- . 1912d. Über eine Steppenfauna von Mauer a. d. Elsenz. Sitzungsberichte der Heidelberger Akademie der Wissenschaften, Mathematisch-Naturwissenschaftliche Klasse, B, No. 9. 5 pp.
- . 1913. Über eine neuentdeckte Steppenfauna von Mauer an der Elsenz (bei Heidelberg). *Jahresberichte und Mitteilungen der oberrheinischer geologischer Verein*, n.f., 3:62-78.
- WUST, E. 1900. Untersuchungen über das Pliocän und das älteste Pleistocän Thüringens nördlich vom Thüringer Wald und westlich von der Saale. *Abhandlungen der naturhistorischen Gesellschaft zu Halle* 23:21-368.
- WUST, K. 1951. Über den Unterkiefer von Mauer (Heidelberg) in Vergleich zu andern fossilen und rezenten Unterkiefern von Anthropoiden und Hominiden, mit Berücksichtigung der phyletischen Stellung des Heidelberger Fossils. *Zeitschrift für Morphologie und Anthropologie* 42:1-112.
- WYMER, J. 1955. A further fragment of the Swanscombe skull. *Nature* 176:426-27.
- . 1958. Further work at Swanscombe, Kent. *The Archaeological News Letter* 6:190-91.
- ZAGWIJN, W. H. 1957. Vegetation, climate and time correlation in the early Pleistocene of Europe. *Geologie en Mijnbouw* 19:233-44.
- ZEUNER, F. E. 1937. A comparison of the Pleistocene of East Anglia with that of Germany. *Proceedings of the Prehistoric Society*, n.s., 3:136-57.
- . 1945. *The Pleistocene period: Its climate, chronology and faunal succession*. 322 pp. London: The Ray Society.
- . 1952. *Dating the past: An introduction to geochronology*. 3rd ed., revised and enlarged. 495 pp. London: Methuen and Co.

Panorama of Dance Ethnology

by Gertrude Prokosch Kurath

APPROACH

DANCE as a reaction to life has a long tradition that encircles the globe. Dance ethnology, however, has come into being only within the last few decades. Though studies of dances are to date still individualistic and experimental, the literature as a whole is comprehensive enough so that the time is ripe for a co-ordination of the many different approaches.

COVERAGE AND GAPS

In the course of time, dances from probably every corner of the globe, as well as relevant customs now long vanished, have found their way into literature, for the most part in travelogues or sociological works. The literature of accurate description or analysis falls almost entirely within the last fifty years, and is now also respectable in quantity.

European dance ethnology received impetus from the research of Cecil Sharp in England, early in the twentieth century. Today all European countries can boast large, and sometimes systematic, government-sponsored collections of folk dances, particularly England and the Balkans. The names of the scholars who are most prom-

inent in this work will appear often in the following pages. Wolfram further cites for Austria the work of Ilka Peter, Herbert Lager, and, as the "grand old man," Raimund Zoder; Hans von der Au and Felix Hoerburger, in Germany; Bianca Maria Galanti, in Italy; and Joan Amades and Aurelio Capmany in Catalonia.¹

While the huge territory of the Union of Soviet Socialist Republics had seemed to be represented only by scattered reports of popular dances in anthologies, the ethnologist, I. I. Potekhin, sent (Dec. 12, 1958) a list of 139 bibliographical items which starts with the year 1848 and reaches to the present time. It includes anonymous surveys dealing with the dances of the U.S.S.R. (*Tantsi Narodov SSSR*), and many items containing choreographies and music of special regions, for instance, Azerbaijan (Almasadze 1930) and Moldavia (Onegina 1938). Accounts of Russian dances have been published in Berlin (Moiseyev 1951), Sophia (Okuneva 1951), Prague (Berdychova 1951), and Yakutsk, Siberia (Zhornitzkaya 1956). Further titles and an appraisal will appear in a 1960 issue of *Ethnomusicology*.

Labanotation, a technique of dance notation described below, under "Second Circuit," is in full swing in Europe. According to Knust, who terms it "Kinotography Laban,"

GERTRUDE PROKOSCH KURATH is Co-ordinator of the Dance Research Center in Ann Arbor, Michigan, U.S.A. She was born in 1903 and educated at Bryn Mawr College (M.A., 1928, History of Art) and at the Yale University School of Drama (1929-30), in the U.S. She also received extensive training in music practice and theory, and in several systems of art dance as well as folk dancing, in Germany and the U.S. From 1923 to 1946, she was active as teacher of Modern Dance, as concert performer, and as producer of pageants and dance dramas. Some of her choreographic compositions were based on research in European dances of the Middle Ages and Renaissance, and in American Indian and jazz dance. Since 1946, KURATH has concentrated on dance ethnology and ethnomusicology. Her research has included field work among the Aztec, Otomí, Tarascan, and Yaqui Indians of Mexico, and the Iroquois, Cherokee, Ottawa, Chippewa, Menomini, Fox, Tewa, and Keresan Indians of North America. Among her many articles and co-authored books, she wrote the dance entries for the *Dictionary of Folklore, Mythology and Legend*, and articles on dance for the *Encyclopedia Americana* and the *Encyclopaedia Britannica*; she is also dance consultant for *Webster's New International Dictionary*.

In June of 1958, KURATH accepted a suggestion from the Editor that she write a survey of dance ethnology for *CURRENT ANTHROPOLOGY*. To supplement her data on certain parts of the

world, she embarked on eighteen months of correspondence with scholars in various countries. She received answers, information, ideas, manuscripts, reprints, or illustrations from the following correspondents: Renato Almeida, Henry R. Baldrey, Franziska Boas, Donald Brown, Richard L. Castner, Nadia Chilkovsky, Dance Notation Bureau of New York, Edward Dozier, Blanche Evan, William N. Fenton, Josefina Garcia, Erna Gunther, William Holm, Katrine A. Hooper, James H. Howard, Shirley W. Kaplan, Maud Karpeles, Joann Kealimahomoku, Juana de Laban, Portia Mansfield, Samuel Martí, David P. McAllester, George P. Murdock, I. I. Potekhin, Curt Sachs, Ted Shawn, Estelle Titiev, Frank Turley, K. P. Wachsmann, and Richard Wolfram. Wolfram's contributions were especially substantial.

The first version of this survey, submitted on September 30, 1958, took the form of a symposium among correspondents. By July, 1959, at the suggestion of the Editor, it had taken the present form of an essay, which was then sent for additional CA☆ treatment to eight scholars of whom the following returned comments: Erna Gunther, Fred Eggan, James H. Howard, T.F.S. McFeat, Ted Shawn, and Richard Wolfram. Only contributions of these final commentators are identified by a star. The author and editors wish to express their thanks to the many correspondents and commentators who collaborated on this manuscript.

The exchange of books of Hungarian folk dances containing motifs and whole dances written in Kinetography, against copies of my book and the scores of dances published by my Institute in Essen, is continuing. . . . We have received orders from both Eastern and Western Germany, Yugoslavia, Hungary, Holland, Sweden [for] scores of national and historic dances [1956a].

In Yugoslavia, the Laban system was introduced by Prof. Pino Mlakar . . . the Yugoslav folklore institute has accepted Kinetography as the official method of notation. The first collection of Yugoslav dance scores written in the Laban system has been published.

In Hungary, due to the energetic work of Emma Lugossy and Maria Szentpál . . . the *Corpus Musicae Popularis Hungaricae* contains a large section in Kinetography, and several folk dance collections containing scores have recently been published. In Poland, Prof. Stanisław Glowacki advanced the cause of Kinetography in the thirties, and recently a Kinetography group has been formed under the leadership of folklorist Roderick Lange of Thorn . . . teachers of Kinetography have been trained at the Kinetographisches Institut, Diana Baddeley from Great Britain, Helmut Kluge from West Germany, and Ingeborg Baier from East Germany [1958a].

According to Juana de Laban (letter, Sept. 19, 1958), the Surrey Laban Art of Movement Centre has published national dances of Yugoslavia, Israel, and Austria.²

In Asia it is the dances of India which have received most study, especially the art forms, although lately the folk dances have been described as well. In other parts of Asia, save in Bali, theater dances rather than remote folk forms have drawn attention. Dances of Oceania need systematic study, except for the hula. Australian aboriginal dance has been reported only in ethnographic studies; a team of trained dancers produced a ballet and travel book about Australia instead of a much-needed analysis (Dean and Carell 1955).

The spectacular dances of Africa have been studied piecemeal, in connection with research on music. K. P. Wachsmann, a leading musicologist, is optimistic that his new role as Scientific Officer of Anthropology at the Wellcome House, London, will lead to an integration of music and dance study, at any rate in Uganda (letter, Oct. 20, 1958).

In the Americas, most publications use verbal description only. But there are centers of Labanotation in Cuba, Brazil, Argentina, and Chile (Solari 1958), and in New York, Philadelphia, Boston, and other cities of the United States. Andrew Pearse is trying to elevate the prevailing approach toward Caribbean dance from sensational journalism to serious folklore study. In South American countries, folklorists are feverishly collecting and interpreting not only popular dances but also acculturated and indigenous rites expressed in dance. Especially in Venezuela, Brazil, Argentina, and Bolivia, they have been aided both in research and in publication by government agencies. Remote tribes, however, are generally left to ethnologists, missionaries, and adventurers. In Mexico, research has progressed spasmodically, depending on Government attitudes, since a boom in 1922. A recent bibliography of Latin American dances includes a detailed account of research activities and sponsors (Lekis 1958).

The bulk of the dance publications in the United States deal with European folk dances or European

derivatives such as squares and longways, and some favorites appear repeatedly. But Latin American dances are now popular in dancing schools, and jazz dance, until recently relegated to collections of ballroom dances, is rising to the status of subject for serious research. Dances of the American Indian have been included in a number of ethnographic accounts, though, unfortunately, choreographers were not engaged by the dance-enthusiast Speck, or by the great teams that studied the Plains Sun Dance and Societies, under Clark Wissler and Robert H. Lowie. Further, Mason (1944) and others initiated a great vogue for distorted Indian dances among countless groups of Boy Scouts and interpretive dancers.

In Canada, the disparate British, French, and Indian traditions have been discussed together in popular lectures by Barbeau. Also, there is a miniature manual of French quadrilles (Lambert n.d.) and a book of children's rounds (Barbeau *et al.* 1958). Other anthropologists have investigated some of the native tribes in the vast interior expanses of the country. Some repeatedly beat a trail through Six Nations Reserve, and a choreographer followed in their wake (e.g., Speck 1949; Kurath 1951, 1954, MSc, d). On the West Coast, William Holm is justifying Erna Gunther's encouragement in the reconstruction of Kwakiutl dances. Despite picturesque accounts by ethnographers, choreographers have not ventured into the Eskimo's bleak habitat. As the shamanistic ceremonies and mimetic festivals retreat before the white man's ways, chances for comparisons with the also unstudied dances of the Arctic fade, and chances for the analysis of Eskimo square dances improve.

OBJECTIVES OF DANCE ETHNOLOGY

Notwithstanding the energetic collecting of folk dances within the last fifty years, we have but now arrived at a point where we can begin to define for dance ethnology the subject matter, the scope, and the procedures of this emerging discipline. So far, the views of its devotees are characterized by diversity and much disagreement.

The first question that requires discussion is: What is the subject matter of dance ethnology?

Ethnology deals with a great variety of kinetic activities, many of them expressive, rhythmical, and esthetically pleasing. Would choreology, the study of dance, include all types of motor behavior or only restricted categories? If the latter, what identifies "dance," which uses the same physical equipment and follows the same laws of weight, balance, and dynamics as do walking, working, playing, emotional expression, or communication? The border line has not been precisely drawn. Out of ordinary motor activities dance selects, heightens or subdues, juggles gestures and steps to achieve a pattern, and does this with a purpose transcending utility. When walking attains a pattern, it becomes a processional, which is treated as dance by Wolfram (1951: 54-56), Kennedy (1949: 84-90), and others. A utilitarian activity like rice-planting, rhythmical and often accompanied by song, can easily be stylized into dance (Moerdowo 1957; Shawn 1929: 170). The transformation from occupation to mimetic dance has often been achieved, by processes ranging from imitation to ab-

straction (Kurath, in Leach [1949-50] 1: 277; Lawson 1953: 11; Wolfram 1954). For example, in the codification of gesture into Plains sign language (Tomkins 1929), gesture remained utilitarian and formally haphazard, while in the choreography of Pueblo Indian Tablita dances (Kurath, in Lange MS; Kurath 1957c), gesture was idealized and integrated into a structure of song, symbolic text, and group movement. In a strict sense, dance ethnology would be confined to patterned phenomena. In a broader sense, it could deal with any characteristic and expressive movement, since everyday motions are the roots of dance. Pursued according to the strict sense, this newest ethnic science would have limited usefulness. Pursued according to the broader sense, its findings would be indispensable to all holistic cultural analyses.

A second, closely related, question is: What is the scope of dance ethnology?

Existent definitions of the science contain varying emphases on ethnic and choreographic content. Franziska Boas calls dance ethnology "a study of culture and social forms as expressed through the medium of dance; or how dance functions within the cultural pattern" (letter, July 30, 1958). Ten years ago Kurath made "ethnochoreography" synonymous with "dance ethnology" and defined it as "the scientific study of ethnic dances in all their cultural significance, religious function or symbolism, or social place" (in Leach [1949-50] 1: 352). (See Gunther [2].☆)

Kurath's definition includes a controversial term, "ethnic dance." In her letter, Franziska Boas identifies ethnic dance with "folk dance." Another dance educator's definition of folk dance would apply equally to ethnic dance: "Folk dance may be defined as the traditional dances of a given country which have evolved naturally and spontaneously in conjunction with everyday activities and experiences of the people who developed them" (Duggan *et al.* 1948: 17). But Wolfram includes folk dance in folklore, "the lore of historical high cultures, to which we have direct access, as we belong to them" (letter, Aug. 22, 1958). A performer, La Meri, restricts the term "folk dance" to "communal dances executed for the pleasure of the executant" (in Chujoy 1949: 177). Chujoy defines folk dance as "dance created by a people without the influence of any one choreographer but built up to express the characteristic feelings of a people" (1949: 191). Thurston defines several categories of folk dances (1954b: 4-5):

- (i) Dances of folk-lore. The narrowest use. They include religious and magical dances, occupational dances, war dances, and so on.
- (ii) Dances of the folk. Includes (i) and also popular recreational dances, but not skilled step-dances.
- (iii) Traditional dances. This will differ from (ii) in including step-dances.
- (iv) All non-professional dances. The broadest use.

A class of dances which many people would exclude . . . is the fashionable ballroom dance. . . . But now there is ground for a real difference of opinion.

The American dance-pioneer, Ted Shawn, makes "ethnic dance" subsume "folk dance" as a subspecies, and further distinguishes "ethnologic" or art dance: "I have included pure, authentic and traditional racial, national and folk dance as 'ethnic' and the theatrical

handling of them as 'ethnologic' and the free creative use of these sources as raw material as 'ethnological,' but there is no hard and fast rule, and no clear dividing line" (letter, July 5, 1958). Franziska Boas would "make a distinction between professional dance as distinct from secular folk, much as you might between art and craft" (letter, July 30, 1958). La Meri defines ethnologic dance as "those indigenous dance-arts which have grown from popular or typical dance expressions," excluding folk dance (in Chujoy 1949: 177), but she admits that folk dance "is the dance from which inevitably grows both in technique and spirit the dance-art of a nation" (1948: 33). Thurston (1954b) completely excludes from "folk dance" the commercial dances of the stage and screen, on the ground that the mercenary objectives of commercial dance remove it several notches further from the roots than art dancing.

Ten years ago, Kurath (in Leach [1949-50] 1: 276) inclined to an identification of ethnic and folk dance similar to Thurston's second category above. At present, she would restrict "folk dance" to secular forms, no matter whether of ritual origin; include all types, both secular and ritual, under "ethnic dance"; and agree to the distinction between folk or ethnic dances and art creations.

This still does not settle the question of the scope of dance ethnology, nor have we meant to imply a restriction of scope to ethnic dance. Most students would agree with Boris Romanoff that "the art of ballet cannot be carried into the domain of ethnologic research" (in Chujoy 1949: 92), yet ballet developed from European court dances, just as present-day Japanese Nō drama has its roots in early religious and secular ceremonies (Kurath, in Leach [1949-50] 2: 794). Similarly, while jazz dance originated with the people, it has been adapted to the stage. Nevertheless, jazz, and also modern creative dance, express significant facets of our way of life that are not expressed in square dancing. A culturally complete picture should, as in Miss Boas' definition, include all of these.

This point of view has a champion in an eminent dance historian and musicologist who has considered all forms of dance in his research. Sachs says, "The question whether ethnology includes all forms of the dance must be emphatically answered in the affirmative" (letter, July 7, 1958).

A third question on which there is published disagreement is that of the extent of a need for dance ethnology within the broader field of general ethnology. In part, the answer to this question must await further inquiry into the function of dance in culture, which, in turn, depends on more findings on the relative significance of dance in particular cultures. Scholars have justified their studies on dance, not only by their use to readers in search of information or of material for performance, but also by the functional significance of dance in society.

Thus, Sachs points out that the dance has aided sustenance and well-being (1933: 2). Cherokee dances, like many others, are prophylactic and contain "the principles that insure individual health and social welfare" (Speck and Broom 1951: 19). The Samoan dance aids

education and socialization, because it "offsets the rigorous subordination" of children and reduces "the threshold of shyness" (Mead 1949: 82-83). A statement by Mansfield about the Concheros holds for many other peoples as well: "The dance is the most satisfying expression of their religious feeling" (1952). Such motivations of utility or religious feeling are confirmed by many writers, among them Kirstein (1935: 2): "The subject matter of primitive, or source dances are the seasons of man's life, the seasons of vegetation, and the seasons of the tribe's development or mythic history." Two experts on Yugoslav folk dances hold that, "Folk dances . . . composed the dramatic element of various rituals and actions, each of which had for the man of a primitive society significance of a ritual magic action" (Jankovic and Jankovic 1934-51: 48).

In Western culture, religious content is increasingly relegated to art dance, while folk-dance activities are largely recreational (Mayo 1948: 3; Holden *et al.* 1956: v), or they are educational in that they break down ethnic prejudices (Herman 1957: v) and can, thereby, contribute to world unity (Shawn 1929: xii). This shift of purpose from faith to fun spreads inexorably to other parts of the world, as our dances spread; it widely changes public attitudes in the direction of exhibitionism. "First nights" succeed "first fruits" (Singer 1958: 379).

FIRST CIRCUIT

COMMON PROBLEMS OF CHOREOLOGY AND ANTHROPOLOGY

Choreology recognizes the cultural setting of dance, including the cultural position of individuals and of the sexes, and patterns of social organization and economic activity. It can identify local styles and styles spread over larger areas. Further, choreologists can design comparative studies to solve problems of prehistory, orthogenesis, diffusion, and internal and acculturation changes.

SOCIAL RELATIONS

Individual and Group: Creativity

The individual dancer's role within the group-dance pattern is a matter of local custom. In relatively few places, he can exercise his creative imagination uninhibited; more often he is submerged within the traditional group pattern, or permitted only some leeway.

In native America, limited freedom is reported by many observers. For example, "... every Conchero takes his turn in leading the dance. He can introduce new steps and if the Jefe approves of them they may become favorites" (Mansfield 1952: 151-52). Again, "The Iroquois Eagle Dance illustrates the pattern phenomenon in ritual and it permits the free expression of personality within set forms" (Fenton and Kurath 1953: 75). But contrasting practices between the Woodlands and Plains, and between the Pueblos and the Northwest Coast, are evident. In the Woodlands, "All of these circular and linear formations involve the cooperation of a group, commonly the whole community. . . . Across the

Great Plains and westward, individual exhibitions are at least as popular as group formations" (Kurath 1953: 64). "The joint dances of the Pueblo Indians in which participate a large number of dancers dressed alike and in formation, are quite foreign to the North Pacific coast where the single dance prevails" (Franz Boas 1955: 346).

The role of the individual dancer may vary within a community, according to the function of a dance: "A sacred-profane dichotomy is still characteristic of the Pueblos. . . . [In secular dances,] there is no limit to improvisation and to the introduction of novel forms, whereas such innovations are strongly discouraged and controlled in other ceremonies" (Dozier MS:149).

In modern America, the set patterning of square dances (Mayo 1948) contrasts with the almost chaotic freedom and formlessness of jitterbugging (Kurath and Chilkovsky 1959; Kealiinohomoku 1958).³ (See Fig. 4.)

Elsewhere over the world, we find similar variety, with freedom generally a male prerogative, however, as in Yugoslavia: "Single folk dancers who are phenomenally gifted introduce into the collective style something of their own individuality. This must remain within the frame of the collective technique" (Jankovic and Jankovic 1934-51: 30). According to Hamza, the Ländler and Schuhplattler dances of Bavaria and Austria permit improvisation only to the male: in former times improvisation was imaginative; today the forms are more stereotyped (1957: 23). (See Fig. 9.) In Samoa, dance is still individualistic, being especially free for the boys: "It is a highly individual activity set in a social framework" (Mead 1949: 78). It is remarkable how male exuberance is similarly expressed in these otherwise contrasting cultures through stamping, leaping, clapping, and slapping of the thighs (Hamza 1957: 24-25; Mead 1949: 80-81).

Male-Female Roles

Let us look now at male-female relationships, first in terms of exclusive societies and the effects of exclusiveness on dance patterns, and then in terms of mingling of the sexes in dancing.

Anthropologists have reported the initiation rites of male dance societies. In addition, a theater expert has made a study of dramatic and choreographic patterns in the masked rituals of Patagonians, Australian Aborigines, and other primitive people (Eberle 1955). These rites, from which women were excluded or by which they were frightened, have now mostly died out. Analogous warrior ceremonies in the North American Plains are also in the throes of extinction or survive only in the War or "Grass" Dance. The reports for these rites are unfortunately too sketchy for reconstruction of their dances (Wissler 1916). In Europe, the traditional ceremonies of surviving male brotherhoods have been carefully described, and sometimes analyzed, for instance, the Calușari of Rumania (Wolfram 1934; Sachs 1933: 227-28), the sword dancers of Austria and England (Wolfram 1951: 66, 82; Kennedy 1949: 60-77), and the puberty rites of Hessen-Nassau; both in Europe and in the Plains, the societies emphasize age-grading (Zoder 1950: 87-90; Wissler 1916).

Women's ritual societies are absent in many cultures. However, in Yugoslavia the rain-bringing Dodole are

young girls who dance from house to house (Jankovic and Jankovic 1952b: 13). Austrian female societies function at weddings (Zoder 1950: 91-92). The Iroquois have some women's dancing societies (Kurath MSA), as do Southern Plains tribes like the Ponca (Howard and Kurath 1959: 5).

Males generally dominate ceremonial activities. Of the ten Kiowa tribal dances, Gamble says that five are exclusively for men, and none are for women alone (1952: 100). Among the Iroquois, on the other hand, the women are more prominent. And in Brazil, Almeida voices surprise at the monopoly of females in the rite, Bumba-meu-Boi, both as chorus and dancers (1958a: 12). In Asia, their prominence varies in adjacent countries, and even within a single country. Thus, in the Cambodian dance dramas, girls play both princes and princesses (Shawn 1929: 160), but in Japan and China, female roles are usually played by men (Shawn 1929: 51). In Japan, again, it is priestesses who "perform the type of dancing called Kagura" (Shawn 1929: 37-38).

Customs governing the participation of the sexes recur strikingly throughout the world. To give just one example, for Yugoslavia and the Iroquois, specialists have made identical observations as to separation within a line, alternation, or pairing: "In earlier times men and women danced in separate kolos, but the female kolo was led by a man. . . . Later they danced the same kolo but grouped by sexes" (Jankovic and Jankovic 1934-51: 14). "Each sex fulfills specific ceremonial assignments and enters the dance in a prescribed order. . . . Social dances pair the sexes; most ritual dances segregate them in a line. . . ." (Kurath 1951: 124).

The arrangement of the sexes may provide a clue for relative chronology, for observations from various parts of the world seem to corroborate the statements from Yugoslavia and the Iroquois. Initiation and shamanistic rituals are danced by men alone or women alone (Eberle 1955: 186). Wolfram (1951: 82) considers such rites and their European survivals very ancient. In agricultural ceremonies men and women participate but without contact, as in the Pueblo Corn Dance (Kurath 1957c). But in social dances the mingling has become more intimate (Speck and Broom 1951: 66; Gamble 1952: 102).

Though courtship is one of the most fundamental of human activities, couple dances with courting mime appear to be fairly recent. In some couple dances, the man and woman hold hands, perhaps with many intricate arm figures, as in the Austrian Steirischer (Wolfram 1951: 180-83) or the Renaissance Allemande (Horst 1940: 31-40). The embrace dance evolved in Central Europe from the sixteenth-century Weller to the nineteenth-century Waltz (Sachs 1933: 184ff., 257). In American Indian social dances, the man may place his hand on the woman's neck or shoulder (Martí 1959: 143). In modern Pan-Indian couple dances, partners cross arms or lock elbows, but probably as a result of White influence (Kurath 1959: 34).

Organization

Ritual, but not secular, dances are generally organized according to the objectives of the enacting group, be it a small closed ritual society, a hereditary division, an economic group, or some combination of these.

1. *Ritual Societies.* The male societies discussed above have traditional systems of officeholding. Sometimes officers serve for life; sometimes they are elected periodically. The roles of the officials find choreographic expression, and are often identical with leading roles in professional dancing guilds (Wolfram 1934: 1951: 75-85).

In Mexico these organizations tend to be elaborate and often hierarchic, and the reflection of these features in choreographic grouping is evident to both ethnologist and dancer: "The Yaqui have a closely knit organization with three major divisions. The first is the church organization proper, which appears to be allied to the matachin dancers' society. . . . Next is the dancers' society, and thirdly is the fariseo (dancing clown) society" (Beals 1945: 107). "The Yaqui Matachini are led by a monarca and each of the files by a monarca segundo; the rank and file are called soldados" (Kurath 1952: 237).

The hierarchy of the Concheros society has a multiple function: "The organization is military as to discipline and titles, and a religious brotherhood as to purpose and the vows and obligations of members" (Mansfield 1952: 144). The captains also lead the dances (Kurath 1952: 237).

2. *Clan and Moiety Organizations.* Though perhaps modeled on civic organizations, and even linked with them by an overlap in leadership roles, ritual societies remain discrete. However, sometimes ritual organization follows hereditary and antithetical clan or moiety divisions. This phenomenon has survived among North American Indians such as the Creek, Yuchi, and Cherokee in the Southeast, the Iroquois and Musquaki in northern U. S., the Pueblos of the Southwest, and others, and among some of these peoples it finds choreographic expression.

For example, Speck observes of Iroquois dance forms that, "On each 'side' or moiety, there are two groups, the one of males, the other of females" (1949: 39). Similarly, the Seneca Eagle dancers, paired by opposing moieties, "always face their partner" (Fenton and Kurath 1953: 233).

Such relationships affect the spectacles and plaza circuits of the Pueblo Indians as well. In ethnographic terms, "Each Tewa pueblo is comprised of two divisions or moieties," which successively govern the ritual observances appropriate to the summer and winter halves of the ceremonial year (Dutton 1955: 6). In choreographic terms, "The Tewa moiety pattern has a profound effect on the circuits. . . . In San Juan the winter and summer moieties operate in harmony. . . . Santa Clara is split into four parties. All parties follow a set circuit" (Kurath 1958a: 24-25).

In other parts of the world, clans and not moieties are the significant hereditary divisions, as in Scotland, and clan totemism produces complex rituals, as in Australia (Eberle 1955: 427-53). However, the relationships between clan divisions and dance patterns have not been clarified, whether because of non-existence, or non-observance by field workers, we do not know.

3. *Economic Groups.* Economic specialization often creates occupationally disparate groups with special

dances, dance organizations, and dance functions. Gorer distinguishes these characteristics in African communities: "The best dancers come from the smaller, hunting tribes. In the larger, agricultural tribes dance diminishes in importance and vitality" (1944: 34). Tax observes that a Guatemalan community "that specializes in maize may pay more attention to the ritual aspects of culture—rain, planting, and harvest ceremonies. . . . Industrial communities should show special characteristics in contrast with agricultural communities. . . . They should be more secular-minded since they are less dependent on the vagaries of nature and more dependent on trade and money" (1952: 63). Agarkar emphasizes the superior dancing of lower castes in the Maharashtra of India, and the difference in dance types among "three main groups that are culturally distinct, namely, the Brahmins and the other advanced classes, the agriculturalists and allied tribes and the hill-tribes" (1950: 3). In Austria, craftsmen and miners retain occupational dances.

Urban-rural and class differences in dance forms exist in the West (Kurath 1952: 237; Lekis 1958: 90), but they are not so sharp as in India with its caste system. Thus in Brazil and Cuba, city has borrowed from country, with mutations (Lekis 1958: 202, 238), and in Europe, the court took from the peasantry (Horst 1940: 99–105), or the two engaged in give-and-take (Kennedy 1949: 102).

CHOREOGRAPHIC AREAS

A survey of dances over the world—or over even a limited area of the world—reveals dazzling variety, as suggested by the following comments on, respectively, Africa, Madagascar, and Greece. "African dancing . . . involves the whole body . . . ; the dance steps are above all acrobatic" (Gorer 1944: 19–20). "The movements . . . are very largely of the hands with rather minute sorts of gestures with the fingers" (Danielli, in Thompson 1953: 41). "The predominant feature of the dances is the variation of rhythm in slow and quick steps" (Crosfield 1948: 23). (See Fig. 5.)

Most students of continental forms have preferred to treat their subject according to political units, e.g., by countries of Europe (Alford 1948–52) or by states of Spain (La Meri 1948). Still other choreologists have delimited studies in terms of linguistic groupings (Lawson 1953) or topographical surroundings (Agarkar 1950: 3). In separate publications, Kurath, Mason, and Mansfield have agreed on the general characteristics of Amerindian dance as distinguished from European-derived dance of the New World; but Mason considers inter-tribal differences inconsequential (1944: 9–10), while Kurath is impressed by the cultural implications of these differences and by the usefulness of area mapping.

Fortún de Ponce (1957) shows Bolivia's regional differences on a map. Dances of native North America may be simpler to map than those of other parts of the world, where castes or racial mixtures complicate the picture, or where surveys are to date still sketchy. However, such mapping is highly desirable and could be carried out in terms of a number of criteria, the most fruitful being that of ecology.

It is certain that environment affects the repertoire, the content, and the form or style of ritual and dance. Common or similar natural resources have produced similar beliefs and dance rituals, for instance, in the Great Lakes region (Kurath 1957a: 1). Primary dependence on a certain commodity, such as maize or buffalo, everywhere inspires dances appropriate to that commodity. Subsequent tribal shift to a new environment enriches the repertoire, witness the Musquaki (Kurath MSd) and the Plains-Ojibwa (Howard MS: 24), both of whom migrated from the Woodlands onto the Plains and took on buffalo ritualism while retaining a residue of Woodland dances.

Such dances may well persevere after the extinction of the object-species, as does the Iroquois Passenger Pigeon Dance at the modern Spring Maple Festival (Fenton 1955: 1–2), or after a new religion has rendered the rites meaningless (Slotkin 1957: 13). On the other hand, the repertoire might change with the loss of aboriginal occupations such as hunting (Gamble 1952; Kurath 1958b). Studies focused on this problem might reveal similar phenomena in parts of the world other than America.

However, an analysis of dance form requires more insight than does an inventory of dance repertoires. Encouragingly, formal and evaluated analyses exist for several ecological zones of the world. Agarkar (1950) has made a noteworthy contribution in relating ecology and dance form in Maharashtra. Lawson has suggested connections between topography and dance movement, such as the traveling movements of steppe dwellers and the leaps of mountain people (1953: 32). Wolfram has made similar observations about Austrian mountaineers and plainsmen (1951: 200). However, Sachs cautions against hasty generalizations about geographical differences, saying "scholarly research into this question is still remote" (1953: 53).

Explanations for these differences are even more hazardous. Ecology certainly is an important factor in determining occupation, ritual, and dance; and it may prove to have an influence on style. Kurath has observed similar dance formations among widely removed agricultural groups (1956a), but doubts the applicability of ecological criteria to finer points of style. In addition, other factors must be weighed. Racial characteristics suggest themselves as a criterion when one compares Gorer's comments on Africa with Courlander's remarks on the "gross, direct movements" of Haitians (1944: 35) and with Dmitri's statement about the "use of the whole body" in Brazilian dances (1958: 9). Such a criterion receives further support from Kealiinohomoku's comparison of African and American Negro styles (1958). Again, Lawson (1953: 202) suggests linguistic affiliation as a reason for choreographic similarities. Several writers have speculated on psychological causes: Holt and Bateson speak of searching for the "cultural temperament" that motivates leaps or shuffles (1944: 52); Sachs has voiced daring theories on the relationship among manner, temperament, and environment (1933: 128–29); and the Jankovics seek the source of style in the "spirit and character of the people" as well as in externals of "social, economic and political conditions, geographical, topographical, and climatic circumstances" (1934–51: 29).

RECURRENT FORMS: ORTHOGENESIS, MONOGENESIS, OR DERIVATION?

As impressive as local variation, and more baffling, is universally recurrent manifestation, e.g., of "Rituals for increasing food supply, augmenting raw materials, controlling the weather, and warding off natural catastrophes" (Titiev 1955: 404-406), and of corresponding dance practices (Kirstein 1935: 1). Three main theories have been advanced to account for this: (1) orthogenesis following parallel invention; (2) common archaic origin, and subsequent migration and local adaptation; (3) derivative diffusion by direct culture contact.

In given cases, definitive explanations are usually wanting, but they can be arrived at by several modes of reasoning. Obvious and simple, or superficial, similarities of form suggest (1), while agreement of many elements and of complex, unusual patterns suggests (2). Further, at times archaeological or historical facts afford helpful evidence. Thus, for the maskers and rounds of Middle America and Central Europe, Kurath suggests independent origin under analogous circumstances (1956a: 296). Again, Spence and Sachs have both historical and formal evidence for direct, ancient connection of the present "Pyrrhic dances of the Balkans, Southern Russia, and even Southern France, which was powerfully affected by Greek culture" (Spence 1947: 3). On the basis of element count, Sachs proposes Rumania as the center of origin for these pyrrhics (1933: 228). On the strength of an equally striking list of common elements, Kurath bases arguments for (3), that is, for the derivation of New World correspondents out of this Old World base. For more recent events, historical documents can substantiate theories of derivation (Fenton and Kurath 1953; Kurath 1956a: 287, 292). Modern folk dances clearly betray their history of derivation, through name, form, and documentation (e.g., Tolman and Page 1937).

DYNAMIC PROCESSES

Continuity

Thanks to a streak of conservatism, many peoples have retained dances unchanged through centuries, e.g., the Japanese (Matida 1938), the Yugoslavs with their ritual mime (Jankovic and Jankovic 1957: 53-57), and the Pueblo Indians (Dutton 1955: 6-16). All dances have roots in some ancient form, but some cling to the roots with remarkable tenacity. One of the most famous examples of the latter is the European chain-and-song-dance, of which Wolfram says, "A Greek picture from Ruvo (400 B.C.) shows a chain-dance at a funeral. In modern Greece as well as in southern Italy such dance-forms, looking exactly like the old picture, are still current and are called 'Tratta,' for instance, at Megara" (1956: 33-34). These dances have been accurately notated and rhythmically analyzed in Lattimore (1957) and Crosfield (1948: 8). (See Fig. 5.)

Diffusion

One dance has turned up "all over Europe, north, south, east, and west" (Alford and Gallop 1953: 51). "In England it is coupled with the Maypole" (Kennedy 1949: 97). In the district of Parnassus its steps are "the

same as on the Faroe Islands" (Wolfram 1951: 90). Wolfram, like others, infers from the steps a relationship between the Faroe rounds, the Yugoslav kolo, the hora of Rumania, and the French branle of today and of the sixteenth century. Yet each of these dances shows peculiarities of local style. (See Fig. 10.)

Some dance phenomena have spread even farther—the hobbyhorse almost around the world during prehistoric times (Spence 1947: 143-44, 167ff.), the modern fox trot under our very eyes. Diffusion can be supported by documentary as well as formal evidence, as in the cases of the Eagle-Calumet complex (Fenton and Kurath 1953) and the Morisca type from the Old World to the New World (Kurath 1949; Lekis 1958). (See Fig. 11.) Examples of postulated diffusion are legion, though not all are equally tenable.

Many diffused dances have entered repertoires alongside forms persevering through continuity. If their origin can be ascertained, the amount of adaptation to local style can serve as a measure of the antiquity of this entrance. The fact that Pueblo Buffalo dances have undergone "Pueblo-ization" implies lengthy presence (Kurath 1958b). The American Pan-Indian dance complex betrays recent origin by its faithful adherence to one style, whether performed in Oklahoma or hundreds of miles away (Howard 1955).

Transculturation

Often borrowings are reciprocal, especially among adjacent groups, to the enrichment of the repertoire of each. One example from the Pueblos will suffice: "Tanoans gave the moiety concept, perhaps animal and hunt societies to Keresans while they received in turn medicine societies, katchina cult, perhaps the clown societies and some notions of the clan. . . . Plains-Pueblo borrowing is a lively process" (Dozier MS: 156). (See also Fig. 12.)

Acculturation

Frequently borrowing is largely one-way, and takes place more or less under compulsion. A potent influence in this process was the expansion of European political control. In the New World, spectacular effects developed as blends with, or adapted borrowings of, European forms. Kurath has discussed such ritual and secular resultants in Mexico (1952); Lekis has identified not only Indian-Spanish but also Indian-Negro-Spanish mixtures in many countries of Latin America (1958). Almeida says of Brazil, "Our popular folk ballets are of three origins: Portuguese, African and Indigenous. . . . The blending was complete and these dramatic dances have been entirely remolded" (1958b: 145). (See Fig. 7.)

Kurath considers it possible to unravel the blends into their components. Mansfield voices some scepticism as to the possibility of identifying native and European steps in, say, the dance of the Concheros (1952: 252).

Enrichment

Change can take place spontaneously, through internal development, or as a result of contact with external forces. Huge and varied repertoires have accumu-

lated through millenia of borrowings, as in Yugoslavia with its many historico-cultural layers (Jankovic and Jankovic 1934-51; Kurath 1956a). The Japanese Nō theater combined many cultural strains (Shawn 1929: 22-37), and, as is usually the case, these borrowings were voluntary. On the other hand, the Mexican Indians accepted, remolded, or created new forms under forcibly imposed European influence (Santa Ana 1940: 128), while they abandoned many indigenous ceremonies. In the same way, forced migration, as well as conquest, can develop rich blends, but always with some loss, for instance, the rites of the Haitian Negro (Courlander 1944). The difference between these two processes furnishes a subject for future study in dance adjustments.

Decline

Perhaps all dances are destined ultimately to decline. Currently in all countries, conservatives lament the deterioration of dances under pressures of modern industrial civilization, e. g., Agarkar, Wolfram, Vega. The decline takes various forms: change in overt features, such as paraphernalia (Lange 1957: 72-73); change of function, such as from hunt to weather control (Kurath 1958b: 439); secularization (Gamble 1952: 95); "discrepancy between the ideal and the actual" (Slotkin 1957: 15); deterioration of performance quality (Kurath and Ettawageshik 1955: 3); and simplification (Sturtevant 1954: 64). This pattern, noted among American Indians, is paralleled among the Yugoslavs, according to the observations of the Jankovics (see "Second Circuit," "Hypotheses"), and may well apply over the world.

Resurgence

The phenomenon of resurgence appears in various guises. For instance, renewed enthusiasm for tradition has in Santa Clara and Isleta Pueblos produced "a resurgence of dancing . . . and old dances which have not been performed for years have been revived" (Dozier MS: 148). But in Israel, where immigrants from diverse countries are reviving the ancient Hebrew culture, splendid new folk dances have arisen "from Chassidic and Yemenite traditions, from the energetic Horas of the Balkans, from the Arab 'Debka' . . . a synthesis between Orient and Occident" (Kadman 1956: 166). In Austria, revivals have grown not only out of scholarly, conscious efforts, but also among the folk, for example, the Salzburg "Jakobischützentanz."

Rebound

Rare and entertaining is the rebound of a dance from a land of acculturation to its home soil. Kealiinohomoku, Chilkovsky, and Kurath can corroborate the statement by Herskovits that "the dance itself has in characteristic form carried over into the New World to a greater degree than any other trait of African culture" (1941: 76). Now, reports Jones, the young African neglects his own heritage for a Euro-African song-dance, Makwaya, and for adaptations of modern American ballroom dances (1953: 36-37).

Review

Interpretation of dynamic processes relies on a core of style and structure that is manifested not only in the

dance patterns of a culture but also in the human relations, social organization, adaptation to environment, and adjustment to contacts of that culture. The unraveling of dance mixtures depends on separate analysis of both the intruding and the native patterns as well as on analysis of the mixtures. In this way do anthropological and choreographic aims and methods parallel one another.

RELATION TO OTHER FIELDS OF RESEARCH

Psychology

"The anthropologist can find in the study of the dance corroborative materials for his observations, as well as clues which will direct his research toward new aspects" (Holt and Bateson 1944: 52). This applies to normal behavior, to buffoonery (Beals 1945: 102, 129-31), to possession by deities (Sachs 1933: 35, 43; Herskovits (1950: 881-82), and to "holy dancing" of the American Negro (Kealiinohomoku 1958: 105).

From analysis of rhythm and tempo in curative Amerindian rites, it appears that the "effects are the very opposite from the derangement" (Tula 1952: 118-19). Again, symbols have been devised to denote mental states, for example, "extravert" and "intravert," and their corresponding dance postures (Loring and Canna 1956: 7-9). In combination, techniques and findings of this kind have unexplored possibilities for modern psychiatric treatment, as has been pointed out by both a physician and a dancer: "Dance as a therapeutic agency . . . is quite unparalleled in potentialities" (Lawton, in Chujoy 1949: 144); "The possibilities of dance as mental therapy must be explored" (Franziska Boas 1944: 6). Blanche Evan is training her pupils for treatment of neurotic patients and for preventive therapy (brochure, 1959).

Technology

Choreologic findings apply also to technology, especially to the study of work movements. Occupational dances can be magico-mimetic, such as the planting mime of the Portuguese Bugios (Alford and Gallop 1935: 117), or recreational, such as the Philippine Balitao or rice-planting dance (Shawn 1929: 170). They can fall differentially along a scale of stylization, from the realism characteristic of the Balitao to the abstraction that marks the mining symbolism in the Dürnberger Schwerttanz (Wolfram 1954: 1-2). We have already remarked that occupational dances are numerous (Kurath [1949-50]: 277).

Anthropologists have studied traditional movements in work and in craft production from a practical point of view (Weltfish 1946), and have evaluated some components of the movements with regard to an economic transition to industrial techniques (Salz 1955: 111, 228). Lately, engineers have clamored for scientific roads to industrial efficiency (Gomberg 1946). Techniques for improving kinetic patterns are available and have had incipient application. Specifically, Laban's system of Effort symbols can be used to notate actions and to expedite efficiency training. The system depends on criteria of "Weight, Space, Time and Control of the Flow of Movement" for well-regulated, less fatiguing actions (Laban and Lawrence 1947: 406).

After all, motions of work and sport have the same dynamic components as those of the dance—"Swing, suspense, sustained resistance, percussive impact, thrust and throw, relaxation" (Prokosch 1938: 294).

Linguistics

There are two promising approaches to the connection between dance and the spoken word. One is the study of the "manifestation of the relation between language and symbolic movements, standardized in each cultural area" (Franz Boas 1955: 346-47). Among the recreational dance-mimes to words, a delightful example is Barbeau's collection of French Canadian children's rounds (1958: 17-18, 98, *passim*). Again, it is often possible to define the connection between the ideology and the patterns of gesture code, as with the Cochiti Tablita-dance gestures (Kurath, in Lange MS).

A second topic for research arises from the question: To what extent are choreographic similarities linked to original linguistic relationships or to later culture contact? Lawson believes that stylistic likenesses between the Finns and Magyars may be due to linguistic affinity, and the differences to separation and different environments (1953: 202-204). Kurath would attribute likenesses between the Iroquois and Cherokee both to linguistic and to cultural connections. She has observed that the long-separated Shoshoneans, the Hopi and Comanche, have different dances, but the unrelated, adjacent, Tewa and Keresan Pueblos share a similar dance culture. Evidently both factors are operative.

Mythology

The spoken word, mythological beliefs, and dance drama are often integrated. In Hawaii, the dancer chants his own accompaniment—"their great dances, the great hulas: they are from the gods" (Campbell 1946: 32)—and with symbolic gestures enacts the words. On the Faroe Islands, dancers enact tales of the Sigurd legend as they sing them. In Malabar and other parts of Asia, a separate chorus sings for the actors of the Ramāyana and Mahabharata (Bowers 1953: 64-87), much as the Greek chorus voiced dramatic words. In America, myths are rarely enacted, but a close relationship between imagery, song, "birdlike dance and the myths" is characteristic of Kwakiutl dances, for instance the *MatEM* (Gunter MS). The Iroquois False-Faces impersonate "the great fellow who lived on the rim of the earth, and secondly, his underlings, the common forest people," by kicking and sparring (Fenton 1941b: 401-402, 420). The more usual situation confronting the dance ethnologist in America is a mere explanation by Indians of a dance's origin, as in the case of the Iroquois *Ohgiwe*, "Death Feast" (see Barbeau 1957, side 2).

Theater Science

In a noteworthy contribution to *Theaterwissenschaft*, Eberle points out that primitive drama mirrors the people's *Weltanschauung*, their beliefs and mythology (1955: 538), and that it does so by a combination of dance enactment, dialogue, music mask, costume, setting, and lighting (pp. 18-19). He shows insight and imagination in his compilation of anthropologists' field materials and in his reinterpretation of them in terms of dramatic structure, though he relies entirely

on verbal descriptions without choreographic symbols or analyses. He confines this work to Australian, Patagonian, and African primitive drama. Others have similarly interpreted the drama of other areas—Spence (1947) largely from literary sources, Alford and Gollop (1935) mostly from observation. While studies of historic medieval dance drama are many, structural analyses of Amerindian forms are few. Speck's study of personally observed Cherokee dance drama (Speck and Broom 1951) suffers from the same omission as Eberle's work—absence of dance and music notation.

Dramatic constituents other than dance and music are often included in choreographic textbooks, e.g., costume and paraphernalia in Alford (1948-52), Evans and Evans (1931), Jankovic and Jankovic (1934-51), Lawson (1953), and Sedillo-B. (1935). The natural setting or native architecture is related to the dances in Bowers (1953), Matida (1938), Dean and Carell (1955), Slotkin (1957), Wilder (1940), and Mansfield (1952). There are also specialized studies: many on masks (Fenton 1941b; see Bibliography to Kurath [1949-50] 2: 687); some on costuming (see notes in Kurath 1958b: 44); and one a penetrating analysis of Melanesian settings (Schmitz 1955). Gunther [3]² comments on these aspects; see also Figure 1 for integration of several aspects. Instruments, often described, are sometimes also related to the dance (Wilder 1940).

Archaeology and Art History

Students of early historic or prehistoric dance drama have consulted sculpture, painting, or architectural remains from those periods. Schmitz lists a respectable number of archaeological sources for his study of the development of ritual settings (1955). Hickman has reinforced his inferences from ancient Egyptian bas-reliefs by observing the contemporary dances of the same region (1957). Nellie and Gloria Campobello have found confirmation on Maya antiquities in the modern Maya movement style (1940: 13-27). Sachs, as reinforcement for his text, reproduces art works of prehistory (1933: Pl. 1), antiquity (Pls. 8-11), and the Middle Ages (Pls. 17-24). Europeanists have a secure basis for historic reconstruction of the Middle Ages and Renaissance in a combination of pictures, verbal descriptions, codes and notation schemes dating from those centuries, as well as modern survivals. Among those who have availed themselves of this rich heritage are Sachs, Wolfram, Gallop, Kennedy, Walter Wiora, and Maurice Louis.

Kurath believes in conferring with the archaeologists themselves, and approached Homer Thomas for chronology in connection with Eurasian ritual drama ([1949-50] 2: 946-47), Joffe Coe for Tutelo mortuary customs (1954: 161), and Bertha Dutton for leads on Pueblo dance prehistory (1958b: 447). Such co-operation could have two-way benefits if choreographers aided archaeologists to reconstruct ground plans and movement styles.

Musicology

While integration of choreology with most of the above-mentioned disciplines lags, the close association

of dance and music are fully realized. Although there are dance studies without reference to music, and musicological analyses of dance music without kinetic references, a huge literature combines these arts. Textbooks for prospective dancers combine the steps with musical measures and counts, by means of various notation techniques discussed below under "Second Circuit." (See Fig. 8). Scholarly analyses go still further than such juxtapositions, particularly in the Balkans where prevalent rhythmic complexities have inspired mathematically exact concordances (Jankovic and Jankovic 1955). Kurath attempted a possibly too detailed analysis of the two arts and their synthesis in the Iroquois Eagle Dance (Fenton and Kurath 1953). Mansfield has demonstrated how "the Concheros steps fit the music so precisely that the playing of the concha becomes an integral part of the dance" (1952: 183).

Yet a vast field remains to be worked. For instance, no one has correlated the intricacies of jazz rhythms with motor responses. Also, no one has gone beyond mathematical counts in the attempt to base musical rhythms on the force and nature of the motor impulses guiding the dances, though Sachs envisions the following process: "Organized in regular patterns, motor impulses pass from the moving limbs to the accompanying music, only to revert from voices, clappers, and drums as a stronger stimulus to the legs and torsos of those who dance" (1953: 38). A very few authors have suggested relationships between emotions, expanse of movement, and melodic lines (Kurath 1954: 160; Lawson 1953: 52; Sachs 1953: 128ff.). In a noted musicologist's opinion, "In dance is found the overt physical expression in visual form of the physical and spiritual aspects of music" (Rhodes 1956: 4). This merges into esthetics.

Symbolics

Dance patterns, gestures, and paraphernalia transcend an ornamental purpose. Indeed, investigators have asked whether ideas symbolized in dance are also expressed by all other arts within a culture. Sachs and Wolfram have speculated on such a connection between arts and culture symbols. Sachs, with caution, suggests an inherent connection (1933: 116-17). Wolfram points out interlaced motifs in crafts and dance (1951: 34-35).

In a discussion of ground plans, Sachs recognizes a widespread, perhaps universal, symbolism in certain circuits, serpentines, and interweavings (1933: 99-119). Today a symbolic significance is attached to the formations of many ritual dances, even in Europe and America, but it has faded from recreational repertoires. How many participants in American square dances realize the original vernal meaning of their "Grand Right and Left" (Kurath [1949-50] 1: 290)? Experts in the *mūdras* of India can communicate, yet foreigners and even Indian government members fail to grasp this gesture code (Singer 1958: 369, 375). The ancient combat symbolism of Moriscos is not apparent to all spectators, and not even to all performers.

Such facts cast doubt on the "universal language" of dance. Yet choreologic methodology rests on the assumption of some universality, and must proceed on the basis of this assumption.

SECOND CIRCUIT: CHOREOGRAPHIC PROCEDURES

Certain procedures used in choreographic analysis, such as observation, interviewing, consultation of secondary sources, and re-study, are shared with ethnologists. However, the analysis of dance requires additional, specialized devices. Dance constituents are only partially revealed by general verbal description. For comparative purposes, symbols are required. Such symbols have been systematized by dance specialists trained in kinesiology and art dance, but these symbol systems, with their respective types of analysis, apply equally well to ethnic dance and art dance, and also to utilitarian activities.

ANALYTIC RECORDING

The recording, and analysis, of dance movements entails breaking them down into their space and time components.

GROUND PLANS

Track drawings, with solid or dotted lines, are commonly employed to depict solo or group movement along the ground, though other schemes serve related but special purposes (e.g., Jankovic and Jankovic 1952a: 58; Hutchinson 1954: 84-87). For complex progressions by large groups, it is customary to draw a series of ground plans. For the identification of males and females, officials, *dramatis personae*, and the directions they face, choreographers have used diverse symbols, identified by a key (Duggan *et al.* 1948; Mason 1944; Vega 1952; Laban 1928; Hutchinson 1954; Kurath 1951, 1958a, b). Figure 1 shows an attempt to depict in one diagram the ground plan, setting, and *dramatis personae* of the Iroquois Eagle Dance (Fenton and Kurath 1953: Fig. 4 by Kurath). The dotted lines indicate the path of the Eagle Dancers. Labels *A*, *B*, *A'*, and *B'* refer to the structure of the music and dance as related to the path of movement. The positions of the other actors are identified by numbers. Furnishings are spelled out. Ethnologists have often attempted similar diagrams for placement of participants or path of locomotion. Beals has successfully shown both placement and path (1945: 177-79).

Ground plans can be juxtaposed for comparison. Figure 2 illustrates a clockwise circle and a counterclockwise ellipse. In both cases the singer (*S*) is in the center. Such diagrams are instructive for area studies, e.g., for contrasting the paths of Great Plains and Woodland Indians' dances (Kurath 1953: 61-62). More complex diagrams can also be juxtaposed, but there is a limit to the amount of material that can be integrated on one page.

BODY MOTION

The graphic representation of three-dimensional body movement on a two-dimensional written or printed page poses problems. Textbooks for schools and the general public have usually bypassed this problem, and depended on technical terms in verbal descriptions, tabulating the verbal phrases with counts and beats. Their authors have often employed stick figures (Mason

1944; Evans and Evans 1931), full-figure drawings (Herman 1947; Mayo 1948), or photographs (Blanchard 1943; Agarkar 1950; And 1959), by way of graphic aids. Raphael Moya has drawn expressive stick figures for Campobello and Campobello (1940), and John Bancroft has given stick figures locomotor value in Lawson (1953). A device for showing footwork is a set of footprint outlines in numbered positions (Shomer 1943: 8, 14-15, 17; Vega 1952: 364-65, 369).

The inadequacy of these devices has for many years led to experiments with symbols. The most complete symbol system, and the one in widest use, is that of Rudolf Laban, termed "Labanotation" in the United States. It is not, however, the simplest one. Other ingenious systems have found useful application in field work and for special dance styles. None of these systems can here be explained in full, but the principles of Labanotation will be illustrated as applied to selected stylistic problems and comparisons. A few examples of other systems, which can combine dance notation with musical rhythms and structure, will also be given.

The Laban System of Notation and Stylistic Analysis

"In 1928, Rudolf Laban published a new system of notation in which he introduced the vertical, symmetrical staff, read from the bottom up and clearly picturing, for the reader facing the score, right and left, front and back. The other invention is . . . using the length of the symbol on the staff to indicate duration of movement" (Hutchinson 1954: 3; see Shawn [5]☆). The level of movement—upward, downward or horizontal—is indicated by the shading of the symbol (Hutchinson 1954: 14; Knust *et al.* [1958] 2: 9-12). The Dance Notation Bureau of New York worked out some officially approved modifications and sponsored the publication of Labanotation for trained dancers (Hutchinson 1954) and for beginners (Chilkovsky 1955-56). Folklorists and anthropologists can find introductions to the system in Pollenz (1949) and in Juana de Laban (1954).

The Laban system records the motion of every part of the body. It can distinguish between a natural walk and various kinds of stylized walk. In Figure 3, (a) represents an ordinary, normal forward walk; (b) represents a shuffling walk, as in American square dancing and in some American Indian stomp or round dances; and (c) represents an elastic, syncopated progression, as in the Pueblo Tablita dances (Kurath 1957c). The system can also show creative or local variants. In Figure 4, individual, creative variation is illustrated by two versions of the Lindy jazz dance, from the notes of Nadia Chilkovsky. In Figure 5, local variation is illustrated by the Greek Syrtos and Kalamatianos, from the notes of Alice Lattimore. Variants of the notations in Figures 4 and 5, as well as symbols in Figures 3 and 7, were approved by the New York Dance Notation Bureau for publication in the *Dance Notation Record* ([1957] 8, No. 2: 6; [1960] 11, No. 1).

Style, or quality, can be shown more precisely by "diacritical" symbols for flexion or extension, accent, dynamics (strength), and effort. These useful symbols can be written separately as style indices (Fig. 6) or attached to a notation staff (Fig. 7). In Figure 6, the most basic style symbols (a) are compared with three other, more abbreviated, devices for showing posture variants.

Thus (a) exemplifies stick figures from Campobello and Campobello (1940: 21 [Maya], 89 [Tarascan], 158 [Yaqui]), the left one indicating erect posture, the middle one indicating stooped posture, and the right one indicating greatly flexed posture. While the other symbols vertically aligned with these in each of the three cases indicates the same posture as the stick figures in the top row, (b) are symbols used in goniometry (cf. Kurath 1954: 160); (c) are symbols equated with extravert or introvert mental stages (Loring and Canna 1956: 9, key 1); and (d) are Labanotation extension and flexion symbols (Hutchinson 1954: 184, 264-65; Knust *et al.* 1958, 2: 5-6, 72-73, 78-79).

Figure 7 illustrates the compactness of the Laban system when applied to an acculturation problem in choreology. The illustration tabulates symbols for dance steps (co-ordinated with their rhythm), and for four aspects of style—posture in torso tilt and flexion, dynamics (degree of tension or relaxation), and effort (strong or weak impact). The problem is the discernment of native and Spanish elements in several hybrid Mexican Indian dances. Example (a) shows a typical step of the native base line in the Yaqui Indian masked Pascola dance (Kurath, field notes; Beals 1945: 120); (b) shows a step from the importation, the Spanish zapateado (Tsoukalas 1956: 19). The native qualities are forward tilt and slight flexion of the torso, relaxation, and fast, direct, strong effort; the alien qualities are erect and extended torso, tension, and fast, direct, light effort. The blends (b), a step of the Yaqui unmasked Pascola, and (c), a step of the Concheros, use the zapateado step, but maintain slight variants of the native qualities. The Concheros step receives a verbal description, with counts, in Mansfield (1952)—upbeat, slight lift on left foot, extended right foot; count 1, step on left foot to left side; count 2 brush right heel forward; count 3, step on right foot, closing to left foot. The efficiency in the use of symbols should be apparent.

Other Systems and Their Application to Musical Problems

All systems have attempted some combination of music with dance steps. The Laban system is convenient in this regard, for the dance symbols can be lined up alongside the musical notation. Several other systems have, however, achieved the graphic integration equally well, for example, those of Stephan Toth in Bratislava, Boris Zaneff in Sofia, Raina Katsarova-Kukudova in Sofia, Rudolf Benesch in London, and Eugene Loring in Los Angeles. The combination of dance notation and rhythm, specifically of long and short impulses, is shown in Figure 8, where (a) depicts a typical Pueblo Indian step (music fragment from Yellow Corn Dance of San Juan in *Midwest Folklore* [1958] 8, No. 3: 157), according to the Kurath system (see Kurath 1953, 1954; Thompson 1953: 35-38); (b) depicts the Mexican Jarabe Tapatio in the Sedillo system (1935: 14) and (c) depicts it in the Mooney system (1957: 28 [F1 means flat; b, ball; S, stamp]); (d) depicts the Bowarian "Zwiefacher"—the Ländler, with changing meter—according to Hoerbürger (1956: 101 [D means "Dreher," or two-count turning step; W, waltz in three-counts]); and (e) depicts the

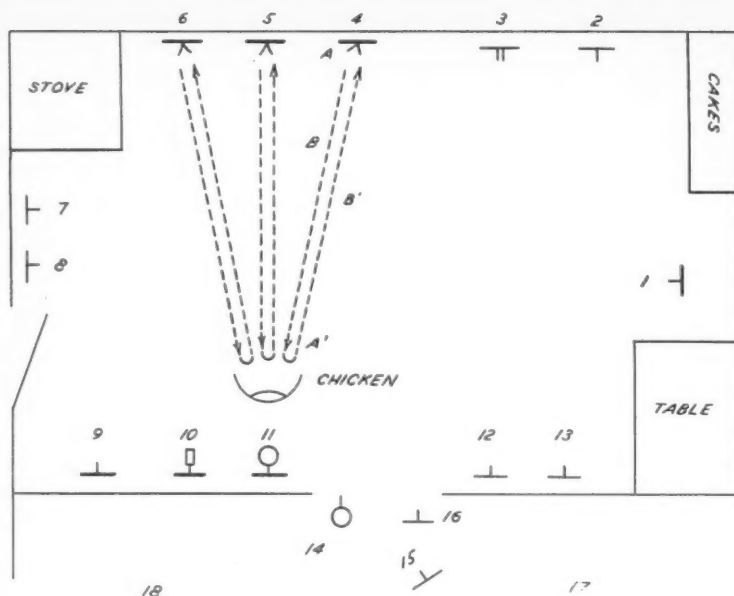


Fig. 1. Integrated ground plan.



Fig. 2. Ground-plan comparison.

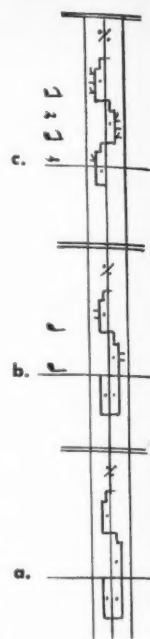


Fig. 3. Labanotation: variations in walk.

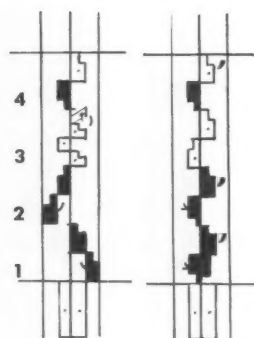


Fig. 4. Labanotation: variants of Lindy step.

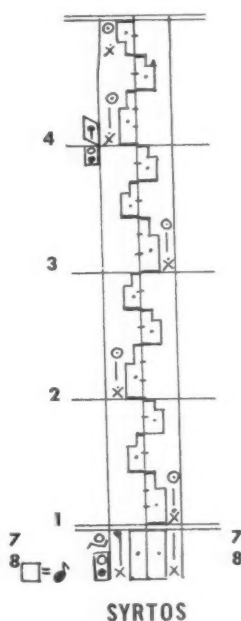


Fig. 5. Labanotation: variants of Greek Syrtos.

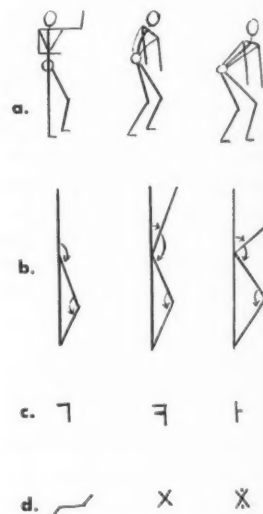
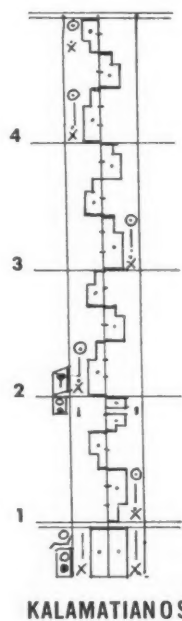


Fig. 6. Several methods of notating posture.

Yugoslav Invertita, in the Proca system (taken from Balaci and Bucsan 1956: 224 [for principles, see Proca 1956, 1957]).

Several systems include devices for showing rhythmic stamps or hand claps. Ilka Peter and Herbert Lager devised one such method, for recording the stamps and leaps of the Perchten of Pinzgau, Austria. Figure 9 illustrates two methods for depicting hand strikes, on various parts of the legs or feet, in two male dances—the Austrian Schuhplattler (a) and the Rumanian Calușar (b). In Figure 9, (a) shows the “Sechterschlag” step in the Schuhplattler dance, according to the Horak system

(1948: 155), which places the dance rhythm on a musical staff (on counts 1 and 3, right hand strikes right thigh; on counts 2, 4, and 6, left hand strikes left thigh; on count 5, right hand strikes sole of left foot, while hopping on right foot). Directly underneath these symbols are the corresponding symbols (Greek letters, delta and sigma, for right and left) for these hand strikes, in the Proca system (1957: 87–92). These constitute (b).

The juxtaposition of dance notation with musical rhythm and/or melody can show the nature of phrasing. It can show, for instance, whether the dance and music phrases or meters coincide or overlap. Such relation-

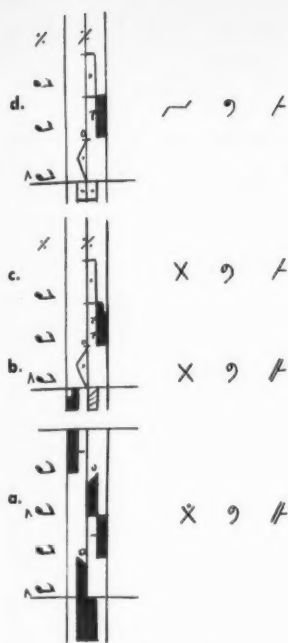


FIG. 7. Labanotation: acculturation problem.

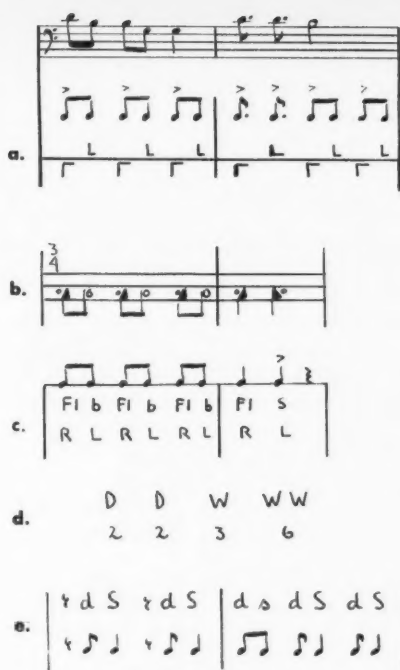


FIG. 8. Several notation systems: step and rhythm.

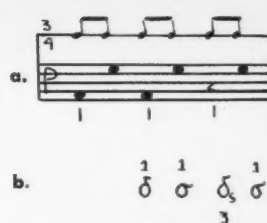


FIG. 9. Two systems: hand strikes.

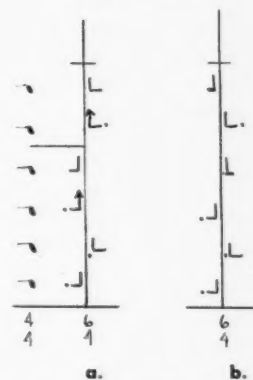


FIG. 10. Kurath notation: diffusion problem.

	Combat	Kill	Revive	Clown	Women	Animal	Mask	Crown	Bells	Feathers
EUROPE										
Rumania—Caluzari . .	x	x	x	x	x	x	x	x	x	x
Portugal—Mauriscada	x	x	x	x	x	x	x	x	x	x
Spain—Seises	x	x	x	x	x	x	x	x	x	x
Mallorca—Cavallets	x	x	x	x	x	x	x	x	x	x
England—Morris . . .	x	x	x	x	x	x	x	x	x	x
NEW MEXICO										
Pueblo—Matachina . .	x	x	x	x	x	x	x	x	x	x
MEXICO										
Yaqui—Matachini . .	x	x	x	x	x	x	x	x	x	x
Tecalpulco—Moros . .	x	x	x	x	x	x	x	x	x	x
Puebla—Santiaguillos	x	x	x	x	x	x	x	x	x	x
Puebla—Negros	x	x	x	x	x	x	x	x	x	x

FIG. 11. Tabulation: symbolic elements in acculturation problem.

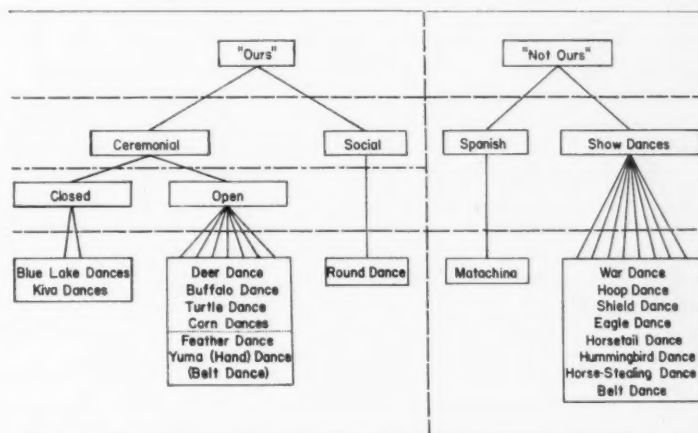


FIG. 12. Classification of Taos dances (1958).

ships are often important indices of local or national style, e.g., in German and Scandinavian dances, the meters usually coincide, while in the Balkans, Rumania, and Palestine, they often overlap. Once a local or national style is determined, by this criterion of phrasing, problems in diffusion can be investigated through comparison of the diagrams which reveal the nature of phrasing. Figure 10, for example, indicates diffusion of the Hora step to the Branle and Faroe step: (a) shows the phrasing of the Hora of Rumania or Palestine (step with left foot; step with right foot; hop on left foot; hop on right foot), while (b) shows the phrasing of the Faroe

step and the French Branle to be essentially the same as that of the Hora, though a toe-touch replaces the hop.

The larger structure of a dance also can be analyzed in relation to the accompanying music, and with the aid of musical precepts, since, as a rule, the structure of the dance matches the music structure. Again, analysis of a folk dance can lean on methods for analysis and composition of art dance, since similar forms recur in both types of dance—the "binary" form of two themes (A B), the "ternary" (A B A), the "rondo" (A B A C A), and so on. After the basic form of the dance has been established, the dance score can be further labeled for its

significant parts, such as phrases and larger sections. Art dancers have published explanations of these structural units, and their works can be consulted for details (e.g., Hayes 1955: 74-87). In dance ethnology, such structural analysis constitutes an interesting study for its own sake, and it can also illuminate problems of local style or of derivation and mixture of styles (Kurath 1954, 1956b, 1959; Kurath, in Lange MS).

ORGANIZATION OF MATERIALS

Distribution maps of stylistic features of dance rarely contain notation symbols, despite the potentialities of symbols for this purpose. Thus, Kurath used other devices to tentatively map choreographic areas (1953: 69) and diffusion paths (Fenton and Kurath 1953: Fig. 30) in North America. Kennedy published a map of England's Ceremonial Dances (1949: 72-73). Several authors have provided pictorial maps of regional dances in Europe (La Meri 1948; Duggan *et al.* 1948; Alford and Gallop 1948-52; Wolfram MS; Zoder 1938: 174-75).

Tabulation has served as a clarifying device in many studies, though, like maps, without benefit of notation. Sachs made frequent use of tabulations for summarizing element distributions (e.g., 1933: 111). La Meri used tabulation in assigning Spanish dances to their various regions and origins (1948: 171-80), and Lekis in charting Latin American dances (1958). In an acculturation study of Mexican Moriscas, Kurath tabulated symbolic elements found in dances of Mexico, New Mexico, and Europe (see Fig. 11, condensed from Kurath 1949: 105-106). Kurath has also tabulated dance concepts and patterns ([1949-50] 1: 280-83, 288-93; 2: 748).

Classification of dances has been carried out according to a number of categories: region (Jankovic and Jankovic 1952b; La Meri 1948; Lawson 1953; Lekis 1958); period (Czarnowski 1950; Kealiinohomoku 1958); social class (Agarkar 1950); origin (Tolman and Page 1937; La Meri 1948; Lekis 1958); function (Kurath 1949; Speck and Broom 1951; Wolfram 1951; Brown 1959); *form* (Sachs 1933; Vega 1952; Holden *et al.* 1956); and *ground plan* (Howard and Kurath 1959: 8-11). Kurath's classification of Iroquois dances (MSa) follows Fenton's classification "into three groups according to their function of bringing man into rapport with particular spirit-forces" (1941a: 144). Brown (1959) has based his classification of Taos dances on native opinions (Fig. 12). Taos Indians have accepted Plains show dances, but have attitudinally kept them separate from their own religious dances. Within each category Brown distinguishes subdivisions, by sacredness or origin.

Evaluation of dance depends on both cultural and choreographic criteria, which vary from place to place. It hinges primarily on stylistic definition, but also on appraisal of factors such as creativity, precision, acrobatic skill, and dramatic ability. Slotkin (1955) devised a ruse for eliciting native standards with respect to a Menominee Contest Dance. Agarkar describes the dances of Maharashtra and publishes the dance-songs in Devanagari music script "with a view to evaluating their social significance and to show the place occupied and purpose served by them in the complex social fabric" (1950: 12). Hein (1958) combines cultural and artistic criteria in evaluating the Rām Līlā of North India. None of these

evaluations has relied on notation, either during investigation or for publication of findings.

HYPOTHESES

Reliable workers have generally hypothesized only in connection with specific problems; often the hypotheses have received subsequent confirmation. Thus Cecil Sharp's theories of the origin and function of the Morris dance have been confirmed and amplified by Alford, Gallop, Kennedy, Sachs, and Wolfram. At times, experts have evolved theories from regional observations which may have universal application. For example, the following findings of the Jankovics on change in ritual dances seem to pertain in parts of the world other than Yugoslavia: (1) change of dance rites, while choreographic elements are preserved; (2) change of choreographic and other elements, while ritualistic purposes are preserved; (3) change of ritual paraphernalia; (4) change of specified age and sex of the participants; (5) disconnection and dissipation of component parts of dance rites, which join and amalgamate with other parts and with folk dances (1957: 58).

Sachs has courageously speculated on symbolism of forms, on paths of diffusion, and other phenomena, prying into prehistory and history to correlate dance patterns with cultural layers, from earliest times up through the periods of Neolithic nobility and peasantry (1933: 148). Frances Wright has been working on a tabulation integrating dance, music, and religious forms through the ages.

Theories must rest on exact and manageable information. Solutions to questions posed above in the "First Circuit" regarding ecology, universality and diversity, psychology, artistic patterns, and practical application await systematic compilation of reliable data.

THIRD CIRCUIT: PRACTICAL CONSIDERATIONS

Past and future accomplishments depend, in part at least, on practical considerations such as the availability, cost, and differential usefulness of recording machinery; the training of workers in the field; and relationships between scholars and laymen.

TECHNOLOGICAL AIDS

FILMS

Dance films cannot replace dance notation, any more than recordings can replace music notation. Even where finances permit photography, no film can supply the data for complete choreographies. Professional films usually cut both dance and music into fragments and obscure them with an educational drone; sometimes they are not authentic. Films by ethnographers often contain short dance excerpts which can serve as a reliable basis for some stylistic notation, but they are, after all, only excerpts. Films by choreographers, though perhaps technically inferior, are more likely to contain essential data because the choreographer tries to phrase the shots by dance sections and to co-ordinate them with notes taken on location. Although, in cases of unposed

performances, they may miss some phrases during rewinds, Kaplan, Kurath, Kealiinohomoku, and Mansfield have made good use of such films for notations.

Techniques are being developed for viewing films at different speeds, repeatedly and backwards, and for halting at particular frames when necessary. Splicer viewers provide a simple tool for the scrutiny of single frames. Connecticut College School of Dance has a three-year Rockefeller grant to work out such techniques with a special projector (Rogers 1958: 5). The English Folk Dance and Song Society is experimenting with the use of films in stylistic analysis (Williams 1958: 111).

Problems relating to film techniques were discussed by the International Folk Music Council at its meeting in 1950, and by the Folklore Conference of 1950. Fragments of a conversation from the latter follow (Thompson 1953: 39-40):

THOMPSON: I was very much interested in Brazil to find that they were beginning a rather systematic collecting of dances . . . of the State of São Paulo. And they were sending out sound trucks with movies. They were able at that time to make a record with sound and also with pictures of these dances, but they had not worked out the technique of co-ordinating these.

KURATH: I regret that we do not have more of these motion pictures and photographs of dances. There is a great technical difficulty in getting all around the dance to see from all points of view. There are two techniques. . . . In the old one you set up a camera and then take the dance from one angle. . . . I think that is the best method for ethnologists. But nowadays there has been developed the artistic method of moving the camera around and getting shots from above and below . . . we are mixed up with tabu. . . . You are not permitted to take movies of any of the ceremonies.

SEAN O'SUILLEABHAIN: We have done some recordings of certain types of folk dances in Ireland. We have the mummery . . . we sent our gramophone to record them and also sent a camera two years ago where we made an hour-long film recording one of these dances. And we also took a record of the people speaking their parts. We had no difficulty whatsoever, and there is no tabu on recording the dance.

Still photography, monochrome or color, can have some value for the analysis of posture, costume and so on, especially if the pictures are taken in series. Such pictures are also more practicable for publication than are frames from films, and have been used to excellent effect in many books, for example, the beautiful set of Ainu dances in a book by Kawano (1956). They cannot convey the kinetic element, however, and thus can only supplement notes and films.

RECORDINGS

Field recordings on disc or tape have the same value for dance study as for music study, because they can supply the basis for the music notation that is vital to the dance score. Recordings are complete and can be used to fill structural gaps left in the films, though the reeling off of the film and the tape can co-ordinate only by chance. Kurath found that a simultaneous use of a recording and a film was very helpful in the analysis of Pueblo and Menomini dances.

Publication of interrelated records and books on dance has unfulfilled possibilities. Popular combinations for folk-dance groups have been sponsored by the

Folk Dance House of New York and the Jewish Education Committee of New York, and great quantities of Folkcraft records have been produced to accompany a *Syllabus* by Herman and a pamphlet by Lapson (1954). The Folk Dance Federation of California has issued sets of interrelated discs and volumes of European and American folk dances. Ethnic Folkways records often are accompanied by dance descriptions. The Folk Dance House of Manchester, England, and other European centers have similar projects.

TRAINING OF DANCE ETHNOLOGISTS

"We should send trained dancers in company with mechanical technicians into all the countries where the native dancing is still true and untouched."

This vision of Ted Shawn's (1929: xiii) has not been realized for several reasons. First, suitably trained dancers do not grow on every bush, as do mechanical technicians. In fact, an adequate course of training—which should include courses not only in anthropology but also in kinesiology or "modern" dance (not ballet), folk dancing, dance notation, and music, preferably by the Dalcroze system of kinetic rhythmic analysis—does not exist. The usual graduate-study requirements in anthropology leave no room for three-year courses in choreography. Moreover, few schools offer the needed artistic combination. Those which do, include the Juilliard School of Music in New York and Rosalie Chladek's School in Vienna. Some have taught ethnic dance routines, such as Shawn's University of the Dance and La Meri's former Ethnologic Dance Institute. All colleges in the United States include modern dance in their physical education curriculum; many, such as Berea, include folk dance; some, for instance Swarthmore and Women's College of the University of North Carolina, have added courses in Labanotation. An increasing number confer higher degrees in dance. Some have accepted Ph. D. projects on ethnic dance, among them Texas Woman's University in Denton (Garcia 1958) and New York University (Mansfield 1952), where Sachs formerly gave a course in dance history. Nevertheless, colleges do not offer rounded courses or degrees in the combined disciplines. As a unique instance, John Mann offers a course on Ethnic Dance in the Social Science Department at Northern Illinois University. The course includes practical and theoretical training in history, forms, techniques, relation to music, and in Labanotation, with emphasis on dances of Polynesia and of the European Renaissance and Baroque periods, and with a more general survey of other styles.

Research that is sound must be done by dancers who have achieved the insight and point of view of the ethnologist, or by musicians and ethnologists with dance training. It is difficult for an anthropology graduate without previous dance training to learn dance theory and notation in a few spare hours. Even the simple Kurath shorthand cannot be learned in a hurry. Prospective field workers whose schedule cannot include choreography may resort to a check-list on dance in the *Guide for the Human Relations Area Files* (Murdock et al. 1954); to two questionnaires prepared by Kurath (*Midwest Folklore* [1952] 2: 53-55 and *American An-*

thropologist [1956] 58: 177-79); and to an amplified list being prepared by Kealiinohomoku.

SCHOLAR AND SCHOLAR

TEAMWORK

It would be a big order for one person to go to the field as choreographer, musician, photographer, technician, ethnologist, folklorist, linguist, and psychologist, and to continue as historian and archaeologist, not to speak of geographer and botanist. Consequently, teamwork is essential. Each member of a team may well master two of the above specialties, and they need not all enter the field at the same time, though this is preferable (see Gunther [4]☆ and Shawn [2]☆).

EXCHANGE OF IDEAS

Conferences

Mailed exchange is possible at a distance, but it is not conducive to alert repartee. Publication often lags years behind discovery, and may, even then, not become known or available to all who are interested. Personal meetings are preferable. The International Folk Music Council gives dance an equal place with music at its annual conferences in various countries. In the United States, the Society for Ethnomusicology and the regional and national folklore societies welcome dance topics. But American dancers rarely attend the former conferences because of the expense, and few belong to the societies. European scholars have profited from frequent meetings. Wolfram, together with forty other experts from Germany, Austria, and Switzerland, was active in the founding of a "Studienkreis Volkstanz" in 1957 in Stuttgart. Under its auspices folk-dance leaders and groups from eight countries met for ten days in August, 1957, at Diest. Again, an international notation congress, held in Dresden during October 1-4, 1957, brought together scholars from many European countries. It was initiated by Wilhelm Fraenger, the Co-Director of the Institut für Deutsche Volkskunde an der Deutschen Akademie der Wissenschaft zu Berlin, and was organized by the Institut für Volkskunsthochschule beim Zentralhaus für Volkskunst zu Leipzig. The frequent European folk-dance festivals also provide opportunities for discussion and seminars. In the United States, the National Folk Festival, managed by Sarah Gertrude Knott, has added small conferences occasionally. But, in the main, outside of Europe, dance scholars have had inadequate opportunities for interchange of knowledge. They have had even less opportunity for consultation with experts in the various anthropological sciences.

Centers

Another requirement for sharing knowledge is a clearinghouse for information. As in the case of ethnology, field materials on dance are strewn about in many archives and private collections, and manuscripts remain in private files unless some publisher has the courage to print them. Films, recordings, and even publications fail to reach interested students, though many items are available in the libraries of centers listed under "Selected Source Materials," below. To an extent,

published items appear in various current bibliographies, in *Ethnomusicology*, and in the *Journal of American Folklore*. For the ethnological aspects of dance, the research scholar can refer to the Human Relations Area Files (headquarters: 421 Humphrey Street, New Haven, Conn., U.S.A.), which are available at several universities in the United States: full quotations on the dance are assembled mainly under Number 535, but also under related topics such as Gestures, Posture, Recreation, Theater, Therapy, Funerals, and Ceremonies. In 1959, a dozen American dance scholars formed the Dance Research Center, with headquarters in Ann Arbor, Michigan. The associates provide and receive information on research activities, publications, and films, and are planning several co-operative projects.

However, Latin American dance folklorists have received government support (see list of sponsors in Lekis 1958) covering both field work and publication. Some groups, such as the African Music Society, successfully turn to UNESCO. In the United States, individual scholars have some small chance at foundation sponsorship for research, but none for processing and publication. Yet the expense of the latter is high. For instance, the preparation of the score for a solo dance, in Labanotation, costs U.S. \$40.00, and, for a group dance, U.S. \$75.00, not to speak of clerical and other costs. But the Dance Notation Bureau is in a position—if financed—to aid individual field and publication enterprises, as Chilkovsky suggests (1958: 1):

We believe that the best assurance will come through a publications program broad enough to include . . . national and folk dance material, and composition studies. Co-operative interchange of ideas by the leading practitioners of movement notation will then result in a widely representative publishing outlook so that all notation needs on all levels and in all centers may be consulted. European countries have already released a wealth of notated national and folk dances. Why not publish books on American Indian dances, jazz steps, West Indian dances, Hawaiian dances?

In the interest of extending notation activity on a world scale, we should like to suggest that the Bureau or Music Publishers Holding Corp., or both, assume leadership in organizing an advisory council composed of notators in all centers, who can act as a clearinghouse for publishable materials. Such a council might be empowered to make recommendations to publishers on the basis of a broad overall perspective.

SCHOLAR AND PUBLIC

Another sponsor of publication must not be overlooked. That is the dancing public, which has determined the policy of many a publishing house and has prompted publication of works by Czarnowski, Herman, and other folk-dance specialists. The dancing public, which receives the information, may at times also provide recruits for research. Educators around the globe have found stimulus in lay demands.

The dance descriptions with their music, songs and social setting . . . are published at this time because of the great demand for this material during the three years of the California Centennial celebration, as well as to satisfy the eager desire on the part of California dancers to learn more about the pioneer dances of their state [Czarnowski 1950: 8].

It is due to this revival [in schools] that an attempt has been made in this book to put into written form some of the dance-

lore, traditional steps and music of South India [Spreen 1949: vii].

Those of us who are engaged in making folklore available to the public are performing a fascinating, interesting and very valuable task, but one that has a good many difficulties. The greatest of these, I think, is that in many cases we are trying to take over a tradition that has developed unconsciously and graft it onto a conscious culture. . . .

Now, as you know, the revival of folk music in England is mainly due to Cecil Sharp. He was not the first person to collect folk songs or perhaps even dances—but he was the first, or one of the first, to see the implications . . . as a form of artistic expression to a modern generation. . . . In 1911 the English Folk Dance Society was formed and from that seed grew our present organization. The methods adopted were classes, country parties, festivals, demonstrations [Maud Karpeles, in Thompson 1953: 199ff.].

The majority of its members come to its dances, classes and festivals for recreation and enjoyment, and . . . a small and serious body of people look to it as a focus for research [Williams 1958: 110–11].

As a result of these activities in England, a society was formed in the United States. At first it was a branch of the English Folk Dance Society, but later it became the autonomous Country Dance Society of America.

Similar societies have mushroomed throughout Europe, at first under scholarly guidance, but recently also without it. For instance, in Scandinavia “thousands and thousands have joined in the dance societies so that just now in Helsinki this summer we have a dancing festival with 1500 dancers from all of the northern parts of the country” (Otto Anderson, in Thompson 1953: 242–43).

That Switzerland has a wealth of old dances became known only slowly after 1930. Volumes of dances were published after that date [by Louise Witzig and others]. . . . Now Switzerland is industrialized, but since 1935 various dance-groups have been formed. . . . The groups also make tours abroad. Thus the groups’ repertoires contain both Swiss and foreign dances, though the latter cannot really be transplanted [Klenk 1954: 13].

The Catalan folklorist, Señor Capmany . . . has worked to introduce Catalan dances and folk songs into schools, and has encouraged *Esbarts*, or societies for folk dance. . . . His solid work in *Folklore y Costumbres de España, El Baile y la Danza* . . . was done in 1931, when traditional dances were left to the people of the soil which bred them, and had not suffered the dangerous invasion by hundreds of youth-groups with diverse foundations unconnected with either soil or dance [Alford 1949: 54–55].

American-born folk-dance groups, as well as immigrants to the United States, show their fondness for European forms. Lately they have become captivated by the sophisticated Balkan and Israeli rounds. These groups greatly surpass the “Amerindian” imitators in desire for accuracy, desire for expert advice, and an increasing demand for background knowledge. All depend for this knowledge largely on books and records, and provide a market for good publications. Some, such as the Philadelphia Folk Dance Center, co-operate with dance notators. (See Lattimore project.)

SCHOLAR AND SHOWMAN

The relative excellence of productions of traditional dances by non-native dancers depends on the integrity of the leaders, as well as on the quality of the members,

of the dance group. At times the work of such groups leads to scholarly research by its members. Thus, after two decades as concert performer of Plains Indian dances, Reginald Laubin in 1959 undertook a research project on the history and cultural place of American Indian dances. Again, Bill Holm’s interest in Kwakiutl dances has developed as follows (letter, Oct. 10, 1958):

Boas’ *Social Organization and Secret Societies* is and has been our “Bible,” supplemented by the material in *BAE* 35th Annual Report. It wasn’t until about seven years ago that the opportunity came to see real Kwakiutl dancing, and from that time to the present we have been getting firsthand information at an ever increasing rate. Four years ago a group of us began building a Kwakiutl-style house. Two years ago we developed a really rewarding relationship with Mungo Martin and his family.

I always try to stick to the traditional form of the dance as I know it, subject to the limitations imposed by space, number of performers available, and the million other things that can make it difficult to reproduce a dance.

From performances given at his Jacob’s Pillow University of the Dance, Shawn notes: “It is interesting to me to see that Shrimathi Gina [an American] gives a meticulously correct rendition of the various schools of Hindu dance, whereas Ram Gopal, a real Hindu, is more theatrical and free in his dances than Gina” (letter, July 5, 1958).

Josefina Garcia states frankly: “My work has been mostly ethnological instead of ethnic” (letter, July 28, 1958).

On the other hand, Paul Virsky, Director of the Ukrainian State Cossack Company, is quoted in Purdon (1958: 162) as saying that, “The future blending of folk dance and classic dancing . . . is not, therefore, to present untouched folk dances of Ukraine, but to express by their means choreographic ideas in a theatrical form.”

Again, Franziska Boas says that when she uses “any ethnographic material in my choreography, I use it from the present creative dance point of view and weave it into the choreography” (letter, July 30, 1958).

The scholar may function as performer, though more often he will counsel backstage. Thus Kurath and Ettawageshik, in the course of an acculturation study, assisted the Ottawa in a production of a “Sun Ceremony.” Ethnologists are evaluating the Pan-Indian powwow (Howard 1955; Schusky 1957).

By their stage performances, native and non-native professionals have performed a valuable public service (see Shawn [4]*). Such artists adapt, and often change, the materials for theatrical purposes, hence face problems different from those of the choreologist, who emphasizes accurate recording.

PROSPECT

This completes the circle back to the question of definition and scope of dance ethnology, to the distinction between dance of the people and of the artist. Shall we accept Thurston’s broad category of “folk dance” and admit the latest jazz steps, which, in Shomer’s words, are

"as timely as to-day's headlines in the newspapers, as interesting as the pulse of America" (1943: 5)? Shall we accept Sach's all-inclusive concept of dance ethnology? Franziska Boas proposes: "It would be interesting to trace relations between folk, ritual and twentieth century modern movement, particularly into the ritualistic aspects of the 'Modern Dance' of the twenties, and what has become of it now" (letter, July 30, 1958).

Any dichotomy between ethnic dance and art dance dissolves if one regards dance ethnology, not as a description or reproduction of a particular kind of dance, but as an approach toward, and a method of, eliciting the place of dance in human life—in a word, as a branch of anthropology.

To establish dance ethnology as a subdiscipline, ethnologists must accept choreology as a science, and choreologists must accept the scholarly responsibilities of being ethnologists. Let us hear the point of view of an ethnologist, James H. Howard (letter, Oct. 16, 1958; see also Shawn [1]☆):

The study of the dance, or choreology, is not only a legitimate but a very necessary part of the ethnological study. It is sometimes difficult for persons in our own culture, where the dance has been relegated to (1) performances of a spectacular nature by a few professional artists and to (2) a rather mechanical means by which members of one sex meet the other half of the population, to understand the importance of dance, as dance, to members of other cultures. Perhaps because of the relative unimportance of dance in Western European culture, most ethnographers ignore the dance completely, as something beneath their consideration, or content themselves with descriptions of the dance costume plus a few striking features (i. e. the "torture" feature of the Sun dance, the "shooting" dance of the Midewiwin). It is necessary, however, if we are attempting to describe a culture, to at least accord the dance the same importance as it is given by members of that culture. Lines of direction, characteristic steps and movements are culture traits and as such are

capable of, and deserve, the same sort of treatment as other cultural elements. It would be well for each ethnographer, as part of his training, to learn some form of dance notation in order that he might record the dances of the group he is studying with the same accuracy he employs in recording kinship data, basket weaves, or irrigation techniques.

Again, William N. Fenton states in a letter (Oct. 29, 1959):

There is now evidence to demonstrate that music and the dance of primitive peoples can be analyzed and published and that these materials make very good tools for cultural and historical analysis and reconstruction. To linguistics is now added a second and third dimension of motor behavior that expresses the covert culture. These externalize the behavior systems that are manifest in language, the dance, and music and they used to baffle the field ethnologist who knew them as the most real expression of the culture but they frustrated him because they eluded his net. Now there are devices for recording these cultural expressions with some hope that they can be analyzed.

Teamwork is the best solution to problems of effecting comprehensive coverage and accurate analysis, given the increasing scope and specialized demands of dance research. This means teamwork between choreographers for standardization of analytic methods and for exchange of data, teamwork between choreographers and ethnographers for constructive application of these methods, and even teamwork between scientists and laymen, the public, the therapist, and the industrialist.

Only teamwork can cope with the widening scope and rapidly changing subject matter of dance ethnology. By the time that choreology is an established subdiscipline, the aborigine will have vanished, and we will have to assess the place of dance not only in mestizo culture but in our own materialistic, hybrid culture.

Notes

1. Space does not permit a historical survey of research activities. However, my brief comments have been augmented by some valuable information on Europe by Wolfram. See Wolfram, ☆ the English of which is a free translation from his German.

2. Wolfram ☆ mentioned a number of publications which are not readily available in the United States. They have been incorporated into the Bibliography below, identified by a star. Wolfram considers Müllenhoff (1871) to be a notable pioneer effort, and considers that Böhme (1886), though not based on personal observations, is a valuable compilation of early source materials.

3. McFeat ☆ comments, "I disagree with the statement . . . regarding 'the formlessness of jitterbugging.' My impression, especially when attending student dances, is that jitterbugging, which has been in form for at least

twenty years, is a very conservative term for what is now called 'rock and roll.' " But I would answer that "rock 'n roll" is derived from jitterbugging and is equally lacking in formations.

Comments

By ERNA GUNTHER ☆

[1] This is an overwhelming paper in its scope and may stimulate further work or frighten anyone inclined to timidity. I would prefer a separation between the true ethnological field and the folk dance of the European and American cultures. I can see the relationship theoretically, but the students in these two fields have such totally different background and orientation that it is difficult to include all their needs and attitudes in a single study.

[2] The definitions of dance ethnology which are quoted need closer scrutiny. I prefer the one of Franziska Boas, which would appeal most to the anthropologist. Kurath's definition of ethnochoreography says really the same as Boas, but it should be a definition of dance ethnology rather than "choreography," since the latter is limited in general usage to the dance pattern and its execution rather than the cultural relations of the dance.

[3] In the great mass of categories for study, there is one absent which I consider of interest, namely, the relation between the dance, costumes, and the place of performance. For instance, a dance executed by firelight before a large group is often seen in silhouette and demands large dramatic gestures, whereas one done for an intimate group in good light can use facial expressions and minute hand movements. If the dancer must handle any part of his cos-

tume, it restricts his arm movements. The relationship of costume to movement in the choreography of a modern dance is very apparent, and leads one to realize that in ethnic dances two lines of development often meet in traditional clothing, on the one hand, and dance gestures and stance, on the other. How are they reconciled?

[4] I hope this study will be the impetus to more accurate field work by teams, as suggested, as well as a detailed appraisal and review of what is actually hidden in many ethnographic sources, that deal with the dance only casually.

By TED SHAWN*

[1] It seems to me that Kurath has done the most complete assembling of facts, and from all possible angles, on her subject. This is an extremely valuable survey, for it places in one article everything that anyone could ask about what knowledge has been accumulated, where it can be found, and evaluations of work done, and it sets out all of the fields of further and necessary research.

I am delighted that anthropologists are finally waking up to the importance of dance. And I feel that dissemination of Kurath's article will promote recognition of the absolute necessity of including study of ethnic dance in any complete dance curriculum.

[2] I am completely in accord with Kurath's ideas on the necessity of teamwork by the dancer-choreographer, trained anthropologist, photographer, sound recorder, and dance notator. Wanting to have my own eyes and ears undistracted during the five days of the Corroboree given in my honor in Australia in 1947, I had a writer for the *Australian National Geographic Magazine* take the motion and still pictures, unsupervised. He shot only on climaxes—the fastest and most violent movements—whereas many of the slower passages were of equal significance.

[3] Kurath probably does not know of the amount of ethnic film I have in my possession: besides that on the Australian Aborigines, I have films taken during my tour (1925–26) in India, Java, Ceylon, Darjeeling (Tibetan lamas), Japan, and many other parts of Asia. I also have films of dancing in Bali, of a "Bee Dance" by Moros in the Philippines, of some Oklahoma Indians taken by a surgeon who had access to dances not seen by any other White man, etc. etc. All these are catalogued, and a copy of this list is available to Mrs. Kurath or to anyone else who wants it (write: Ted Shawn, Jacob's Pillow Dance Festival, Inc., Box 87, Lee, Mass., U.S.A.). These films will eventually be added to the Denishawn Collection in the Dance Archives of the New York Public Library.

[4] Also, she does not give full credit to some of the people who have done a lifetime of research on dance—Roger and Gloria Ernesti, who have specialized on the Indians of the Pacific Northwest, and Mme. La Meri (Russell Merriweather Hughes), whose Ethnologic Dance Institute was the finest clearing-house for knowledge and information on ethnic dance that ever existed, but had to be closed for lack of funds.

[5] Ann Hutchinson, President of the Dance Notation Bureau of America and author of a textbook on Labanotation, agrees with me that the training of notators for the special purpose of working on a dance ethnology team is an admirable project and one which she will endeavor to promote. The most important fact to be faced is that a system of notation to give the greatest service must be *universally accepted*. Exchange of information freely between anthropologists and dance ethnologists can come about only if everyone, everywhere, accepts and uses one system, and Labanotation is the most complete and scientific system ever evolved. Even if a "shorthand" system is used in the field, the shorthand notes should be transcribed into Labanotation at the earliest possible moment, while memory is still fresh.

By RICHARD WOLFRAM*

Folk-dance revival in Europe received its earliest impetus from Sweden and South Germany. In Sweden a student organization, "Philochorus," was founded in 1880. The founder, Philochorus, drawing inspiration from a Swedish ballet master who arranged folklike dances for the Royal Opera, made field trips and presented dance arrangements on the stage. Besides these staged "national" dances, true folk dances persevered in Sweden and engaged the attention of the Folkdansens Vänner (1893) and other organizations. This movement stimulated research in Denmark and the founding in 1900 of the Danish Foreningen for Folkedansens Fremme. This organization, in turn, stimulated Cecil Sharp, who had already collected dances and songs in England and who then founded the English Folk Dance Society in 1911. Swedish developments also influenced North Germany and its Wandervogel and Jugendbewegung. On the other hand, the Trachtenvereine of South Germany arose independently in 1884, and soon extended their interest from costumes to dances, though always for show purposes.

Serious research scholars had to counteract the emphasis on the stage. Like

Cecil Sharp, with his accurate field work, Raimund Zoder in Austria accumulated accurate notes from 1903 on, then Ernst Hamza in 1914, and then others. The scholarly preoccupation spread to Germany, which has produced many exact descriptions and analyses since 1920. France has produced some clean-cut work, such as Monique Decitre's "Dansez la France." Among Romance nations, the Spanish, Bretons, and Catalans have best preserved their traditions. The Basques have also. Italy and France tend to arrange their dances for show purposes. In Russia, Yugoslavia, and Rumania, the government tries to preserve traditions and to encourage research, as well as large ensembles for displays.

National Folk Festivals began in the 1920's in Scandinavia and England. The first all-European folk-dance festival took place in 1934, in Vienna. Out of this came the important festivals and congresses which took place in London in 1935, and in Stockholm in 1939. And out of these grew up the International Folk Music Council and subsequent conferences in Switzerland, Italy, U.S.A., Yugoslavia, England, France, Brazil, Norway, Germany, Denmark, Rumania, and Austria.

Selected Source Materials

Of the published items annotated below as containing useful bibliographies, see especially Lekis (1958) and Horak (1959). For an almost complete list of journals containing articles on dance, see W. Edson Richmond's *Annual Bibliography of Folklore (Journal of American Folklore Supplement)* [April, 1959] Pt. 2: 19–22).

A compilation of theses and dissertations based on dance research is for sale by the National Section on Dance, American Association for Health, Physical Education and Recreation, 1201 Sixteenth St. N.W., Washington 16, D.C.

Films, recordings, notes, manuscripts, and rare books from various countries are on file in the libraries of the Dance Notation Bureaus of New York City (47 West 63 St.) and Philadelphia, Pennsylvania (271 South Van Pelt St.); the Jacob's Pillow University of the Dance (Lee, Massachusetts), The English Folk Dance and Song Society (Cecil Sharp House, 2 Regent's Park Road, London, N.W. 1), The Laban Art of Movement Centre (Addlestone, Surrey, England), the Manchester Folk Dance House (505

Wilbraham Road, Manchester, England), the Folkwangschule der Stadt Essen (22 A Essen-Werden, Germany), the Tanzarchiv of the Musikwissenschaftliches Institut in Regensburg, Germany, and other centers.

The addresses of persons holding private collections of any kind of material relevant to dance ethnology are available from the continually growing files of the Dance Research Center, 1125 Spring Street, Ann Arbor, Michigan, U.S.A.

Bibliography

- AGARKAR, A. J. 1950. *Folk-dance of Maharashtra*. Bombay: Joshi.
- AKIMOTO FUMI. 1953. Japanese dance. Unpublished M.A. thesis, Juilliard School of Music, New York. (Labanotation.)
- ALFORD, VIOLET (Ed.). 1948-52. *Handbooks of European national dances*. London: Parrish; New York: Crown Publishers.
- . 1949. Don Aurelio Capmany. *Journal of the International Folk Music Council* 1:54-55.
- ALFORD, VIOLET, and RODNEY GALLOP. 1935. *The traditional dance*. London: Methuen.
- ALMASADZE, G. 1930. *Ansambly Azerbaidzhan-skovo Narodnovo Tantsy*. Baku, Azerbaijan: Azerbaidzhan State Philharmonic Society.
- ALMEIDA, RENATO. 1958a. O Bumba-Meu-Boi de Camassari. *Modulo* 2, No. 9:7-13. Rio de Janeiro.
- . 1958b. Brazilian folk ballets. *Folklorist* 4:145-48. Manchester, England.
- AND, METIN. 1959. Dances of Anatolian Turkey. *Dance Perspectives* 1, No. 3.
- ARNHEIM, RUDOLPH. MS. "Movement and the psychology of expression," in *The Function of Dance in Human Society* (Second Seminar) (ed. FRANZISKA BOAS), New York, 1946.
- BALACI, EMANUELA, and ANDREI BUCSAN. 1956. Folclorul coreografic din Sibiel. *Revista de Folclor* 1:213-47. Bucharest.
- BARBEAU, MARIUS. 1957. *My life in recording Canadian Indian lore*. Ethnic Folkways Record FG 3502.
- BARBEAU, MARIUS, et al. 1958. *Dansons à la ronde (roundelays)*. Ottawa: National Museum of Canada.
- BEALS, RALPH L. 1945. *The contemporary culture of the Cahita Indians*. Bureau of American Ethnology Bulletin 142.
- BERDYCHOVA, JANA. 1951. *Tance Sovetskikh Narodu*. Popis s obrázky a hudebním doprovodem. Prague.
- BLANCHARD, ROGER. 1943. *Les danses du Limousin*. Paris: Maisonneuve.
- BOAS, FRANZ. 1944. "Dance and music in the life of the Northwest Coast Indians of North America (Kwakiutl)," in *The Function of Dance in Human Society* (First Seminar) (ed. FRANZISKA BOAS), pp. 7-18. New York: Author.
- . 1955. *Primitive art*. 1st ed., 1927. New York: Dover.
- BOAS, FRANZISKA (Ed.). 1944. *The function of dance in human society* (first seminar). New York: Author.
- . MS. The function of dance in human society (second seminar). New York, 1946. (Typed copy provided by JOANN KEALINOHOMOKU.)
- BÖHME, FRANZ M. 1886. *Geschichte des Tanzes in Deutschland*. 2 vols. 339 pp. text, 221 pp. music. Leipzig.
- BOWERS, FAUBION. 1953. *The dance in India*. New York: Columbia University Press.
- BROWN, DONALD N. 1959. The dance of Taos Pueblo. Senior Honors Thesis, Harvard University, Cambridge, Mass.
- CAMPBELL, JOSEPH. 1946. The ancient Hawaiian hula. *Dance Observer* 13, No. 3:32-33.
- CAMPOBELLO, NELLIE, and GLORIA CAMPOBELLO. 1940. *Ritmos indígenas de México*. México, D.F.: Oficina Editora Popular.
- CAVALLO-BOSSO, J. R. MS. Kumanche of the Zuni Indians of New Mexico. Thesis submitted at Wesleyan University for B.A., with distinction in Ethnomusicology, 1956.
- CHILKOVSKY, NADIA. 1955-56. *Three R's for dancing*. (Series.) New York: Witmark.
- . 1958. Editorial. *Dance Notation Record* 9, No. 2:1.
- . 1959. *American bandstand dances in labanotation*. New York: Witmark.
- CHUJOY, ANATOLE (Ed.). 1949. *Dance encyclopedia*. New York: A. S. Barnes.
- COURLANDER, HAROLD. 1944. "Dance and dance-drama in Haiti," in *The Function of Dance in Human Society* (First Seminar) (ed. FRANZISKA BOAS), pp. 35-45.
- CROSFIELD, DOMINI. 1948. *Dances of Greece*. (Handbook series.) London: Parrish.
- CZARNOWSKI, LUCILLE. 1950. *Dances of early California days*. Palo Alto, Calif.: Pacific Books.
- DEAN, BETH, and VICTOR CARELL. 1955. *Dust for the dancers*. New York: Philosophical Library.
- DEMPESEY, HUGH A. 1956. Social dances of the Blood Indians of Alberta, Canada. *Journal of American Folklore* 69, No. 271:47-52.
- DMITRI. 1958. Characteristics of Brazilian dance. *Dance Notation Record* 9, No. 2: 9-11.
- DOZIER, EDWARD P. MS. The Rio Grande Pueblos (including analyses of dance types and organization), in seminar on Differential Culture Change, University of New Mexico, 1956.
- DUGGAN, ANNA S., et al. 1948. *Folk dances of the United States and Mexico*. (From "Folk Dance Library" Series.) New York: A. S. Barnes. (Useful bibliography.)
- DUTTON, BERTHA P. 1955. *New Mexico Indians and their Arizona neighbors*. Santa Fe: New Mexico Association on Indian Affairs.
- EBERLE, OSKAR. 1955. *Cenalaria: Leben, Glaube, Tanz und Theater der Urvölker*. Switzerland: Walter Verlag. (Large bibliography.)
- EVANS, BESSIE, and MAY G. EVANS. 1931. *American Indian dance steps*. New York: A. S. Barnes.
- FENTON, WILLIAM N. 1941a. Tonawanda longhouse ceremonies ninety years after Lewis Morgan. *Bureau of American Ethnology Bulletin* 128:140-66.
- . 1941b. Masked medicine societies of the Iroquois. *Smithsonian Report for 1940*, pp. 397-430.
- . 1955. *The maple and the passenger pigeon in Iroquois life*. Albany: University of the State of New York.
- FENTON, WILLIAM N., and G. P. KURATH. 1953. *The Iroquois eagle dance, an offshoot of the Calumet dance*. Bureau of American Ethnology Bulletin 156. (Large bibliography.)
- FORTÚN DE PONCE, JULIA ELENA. 1957. *La navidad en Bolivia*. La Paz: Ministerio de Educación. (Good bibliography.)
- GAMBLE, JOHN I. 1952. "Changing patterns in Kiowa Indian dances," in *Acculturation in the Americas: Proceedings of the Twenty-Ninth International Congress of Americanists* (ed. SOL TAX), Vol. 2, pp. 94-104. Chicago: University of Chicago Press.
- GARCIA, JOSEFINA. 1958. Latin-American dances. Unpublished Ph.D. dissertation, Texas Women's University, Denton, Tex.
- GILLESPIE, JOHN D. MSa. Notes on the Shawnee bread dance.
- . MSb. Some Eastern Cherokee dances and songs.
- GONYEV, SANDOR, and LASZLÓ LAJTHA. 1937. *Tánc. Magyarorság Szellemi Néprajza IV*. Budapest.
- GÖTLIND, J., and H. GRÜNER NIELSEN (Eds.). 1933. *Idrott och lek, Dans*. Nordisk Kultur XXIV. 198 pp. Stockholm, Oslo, Copenhagen. (Dance in Denmark, Norway, Faroes.)
- GOMBERG, WILLIAM. MS. "Time and motion studies in modern industry," in *The Function of Dance in Human Society* (Second Seminar) (ed. FRANZISKA BOAS), New York, 1946.
- GORER, GEOFFREY. 1944. "Function of dance forms in primitive African communities," in *The Function of Dance in Human Society* (First Seminar) (ed. FRANZISKA BOAS), pp. 19-34. New York: Author.
- GUNTHER, ERNA. MS. A preliminary analysis of Kwakiutl dance.
- HAMZA, ERNST. 1957. *Der Ländler*. Forschungen zur Landeskunde von Niederösterreich, Bd. 9. Vienna.
- HARASYMCZUK, ROMAN W. 1939. *Tánc Huculskie*. 304 pp. text, 56 pp. music. Łwów, U.S.S.R.
- HAYES, ELIZABETH R. 1955. *Dance composition and production*. New York.
- HEIKEL, YNGVAR. 1939. *Folkdans*. Finlands Svenska Folkdiktning 6. 496 pp. Helsingfors: Svenska Litteratursällskapet i Finland.
- HEIN, NORVIN. 1958. The Räm Lila. *Journal of American Folklore* 71, No. 281:279-304.
- HERMAN, MICHAEL. 1947. *Folk dances for all*. New York: Barnes and Noble.
- HERSKOVITS, MELVILLE J. 1941. *The myth of the Negro past*. New York: Harpers.
- . 1949-50. "Possession," in *Dictionary of Folklore, Mythology and Legend* (ed. MARIA LEACH), Vol. 2, pp. 881-82. 2 vols. New York: Funk and Wagnalls.
- HICKMANN, HANS. 1957. *Danses de l'Egypte pharaonique et moderne*. *Folklorist* 4:14-17.
- HOERBURGER, FELIX. 1956. *Die Zwielfachen*. Berlin: Akademie Verlag.
- HOLDEN, RICEY, et al. 1956. *The contra dance book*. Newark, N. J.: American Square Series.
- HOLT, CLAIRE, and GREGORY BATESON. 1944. "Form and function of the dance in Bali," in *The Function of Dance in Human Society* (First Seminar) (ed. FRANZISKA BOAS), pp. 46-52. New York: Author.
- HORAK, KARL. 1948. *Schuhplattlerschlüssel: Beiträge zur Volkskunde Tirols*. Festschrift zu Ehren Hermann Wopfners. Schlern-Schriften, Bd. 53. Innsbruck.
- . 1959. *Bibliographie des Volkstanzes in Österreich*. Innsbruck: Author.
- HORST, LOUIS. 1940. *Pre-classic dance forms*. New York: Dance Observer.
- HOWARD, JAMES H. 1955. Pan-Indian culture of Oklahoma. *Scientific Monthly* 81, No. 5:215-20.
- . MS. The Turtle Mountain Plains-Ojibway. (Sections on dance organizations and forms, and partly transcribed song tape, by G. KURATH.)
- HOWARD, JAMES H., and G. KURATH. 1959. Ponca dances, ceremonies and music. *Ethnomusicology* 3, No. 1:1-14.
- HUTCHINSON, ANN. 1954. *Labanotation*. New York: New Directions.
- JANKOVIC, LJUBICA S., and DANICA S. JANKOVIC. 1934-51. *Folk dances 1-6, a summary*

of *Narodne Igre*. Belgrad: Council of Science and Culture.

- . 1952a. *Narodne Igre*, Vol. 7. Belgrad.
- . 1952b. *Dances of Yugoslavia*. (Handbook series.) London: Parrish.
- . 1955. *Provilno u Nepravilnome* (Le Regulier dans l'Irregulier). *Zvuk, Jugoslavenska Muzicka Revija* 2-3:65-79.
- . 1957. *A contribution to the study of the survival of ritual dances*. Serbian Academy of Sciences Monographs, Vol. 271. Belgrad.
- JONES, A. M. 1953. Folk music in Africa. *Journal of the International Folk Music Council* 5:36-39.
- KADMAN, GURIT. 1956. The folk dance of Israel. *Folk Dancer* 3, No. 1:165-67. Manchester, England.
- KAPLAN, SHIRLEY. MS. Notes on folk-dances of India. (Film and tape.)
- KAWANO HIROMICHI. 1956. *Ainu Odori*. Tokyo: Nirei Shobo.
- KEALINOHOMOKU, JOANN. 1958. A comparative study of dance as a constellation of motor behaviors among African and United States Negroes. Unpublished M.A. thesis, Northwestern University, Evanston Ill. (Analysis of Africa from films, of America from observation; dance notation.)
- KENNEDY, DOUGLAS. 1949. *England's dances*. London: Bell.
- KIRSTEIN, LINCOLN. 1935. *Dance: A short history of classic theatrical dancing*. New York: Putnam.
- KLEIN, ERNST. 1937. Om Polskandanser. *Svenska Kulturbilder*, n.f., Bd. 5, Div. IX, X. Stockholm.
- KLENK, KARL. 1954. Der Volkstanz in der Schweiz. *Folk Dancer* 1, No. 5:9-13.
- KNUT, ALBRECHT. 1956a. Letter to the editor. *Dance Notation Record* 6, No. 5:6-13.
- . 1956b. *Abriss der Kinetographie Laban*. Hamburg: Das Tanzarchiv.
- . 1958. Letter to the editor. *Dance Notation Record* 9, No. 1:3-4.
- KNUT, ALBRECHT, with the assistance of DIANA BADDELEY and VALERIE PRESTON. 1958. *Handbook of kinetography Laban*. (English version of 1956b.) 2 vols. Hamburg: Das Tanzarchiv.
- KONYVILADO, MUVELT. 1954. *Hungarian dances*. (Series Neptancosok.) Budapest.
- KURATH, GERTRUDE P. 1949. Mexican Moriscas: A problem in dance acculturation. *Journal of American Folklore* 62, No. 245:67-106.
- . 1949-50. "Dance, folk and primitive" and other entries, in *Dictionary of Folklore, Mythology and Legend* (ed. MARIA LEACH), pp. 276-96, *passim*. 2 vols. New York: Funk and Wagnalls.
- . 1951. Local diversity in Iroquois dance and music. *Bureau of American Ethnology Bulletin* 149, Pt. 6:109-37.
- . 1952. "Dance acculturation," in *Heritage of Conquest* (ed. SOL TAX), pp. 233-42. Glencoe, Ill.: Free Press.
- . 1953. Native choreographic areas of North America. *American Anthropologist*, n.s., 55:153-62.
- . 1954. The Tutelo harvest rite. *Scientific Monthly* 76, No. 3:87-105.
- . 1956a. Dance relatives of mid-Europe and middle America. *Journal of American Folklore* 69, No. 273:286-92.
- . 1956b. Antiphonal songs of Eastern Woodland Indians. *Musical Quarterly* 42:520-26.
- . 1957a. *Algonquian ceremonialism and natural resources of the Great Lakes*. Reprint 22. Bangalore: Indian Institute of Culture.
- . 1957b. Basic techniques of Amerindian dance. *Dance Notation Record* 8, No. 4:2-8.
- . 1957c. Notation of a Pueblo Indian

corn dance. *Dance Notation Record* 8, No. 4:9-11.

- . 1958a. Plaza circuits of Tewa Indian dancers. *El Palacio* 65, No. 1-2:11-26.
- . 1958b. Game animal dances of the Rio Grande. *Southwestern Journal of Anthropology* 14:438-48.
- . 1959. Menomini Indian dance songs in a changing culture. *Midwest Folklore* 9, No. 1:31-38.
- . MSa. Seneca song and dance style. 1951. American Philosophical Society Library. (Dance notation.)
- . MSb. Onondaga ritualism. 1952. New York State Museum Educational Library. (Dance notation.)
- . MSc. Tutelo dances and songs. 1953. (Dance notation.)
- . MSd. Animal rites, dances and songs of Eastern Woodland Indians. 1955. (Dance notation.)
- . MSe. Tewa Indian dance and music. 1957-58. (Dance notation; film and tape.)
- KURATH, GERTRUDE P., and NADIA CHILKOVSKY. 1960. Jazz choreology. *Proceedings of the Fifth International Congress of Anthropological and Ethnological Sciences* (ed. ANTHONY WALLACE). Philadelphia: University of Pennsylvania Press.
- KURATH, GERTRUDE P. and JANE W. ETTA-WAGESHIK. MS. Religious customs of modern Michigan Algonquians. 1955. American Philosophical Society Library. (Dance notation.)
- LABAN, JUANA DE. 1954. Movement notation: its significance to the folklorist. *Journal of American Folklore* 67, No. 265:291-95.
- . MS. Notes on Hungarian dances. (Labanotation.)
- LABAN, RUDOLF. 1928. *Kinetographie*. 2 vols. Vienna.
- LABAN, RUDOLF, and F. C. LAWRENCE. 1947. *Effort*. London: MacDonald and Evans.
- LAMBERT, OMER. n.d. *Dances Canadiennes*. Quebec: Imprimerie Nationale.
- LA MERI. 1948. *Spanish dancing*. New York: A. S. Barnes.
- LANGE, CHARLES H. 1953. Economics in Cochiti culture change. *American Anthropologist* 55:174-94.
- . 1957. The Tablita, or corn dance of the Rio Grande Pueblo Indians. *Texas Journal of Science* 9, No. 1:59-74.
- . MS. The Pueblo of Cochiti, New Mexico: past and present. Austin: University of Texas Press. In press. (Chapters on ceremonialism, with dance and music analysis by G. KURATH.)
- LAPSON, DVORA. 1954. *Dances of the Jewish people*. New York: Jewish Education Committee of New York.
- LATTIMORE, ALICE. 1957. Kalamatianos. *Dance Notation Record* 8, No. 1:8.
- LAWSON, JOAN. 1953. *European folk dances*. Toronto and London: Pitman.
- LAWTON, SHAILER U. MS. Physiological determinants in movement, in *The Function of Dance in Human Society* (Second Seminar) (ed. FRANZISKA BOAS), New York, 1946.
- LEKIS, LISA. 1956. Origin and development of ethnic Caribbean dance and music. Unpublished Ph.D. dissertation, University of Florida, Gainesville, Fla.
- . 1958. *Folk dances of Latin America*. New York: Scarecrow Press.
- . MS. Notes on Peruvian and Ecuadorian dances.
- LORING, EUGENE, and A. J. CANNA. 1956. *Kinetography*. Los Angeles: Author.
- LUGOSSY, EMMA, and SANDOR GONYEY. 1947. *Magyar Nepi Tancok*. Budapest.

Kurath : PANORAMA OF DANCE ETHNOLOGY

MANN, JOHN. MS. Teaching and research in ethnic dance. *Ethnomusicology*. In press.

- MANSFIELD, PORTIA. 1952. The Conchero dancers of Mexico. Unpublished Ph.D. dissertation, New York University, New York, N.Y. (Music by RAOU GUERRERO.)
- MARIÁN, RETHEI PRIKKEL. 1924. *A Magyaraság Tancai*. 311 pp. Budapest.
- MARTI, SAMUEL. 1959. *Danza precortesiana*. Sobretiro de Cuadrenos Americanos, No. 5 de 1959.
- . MS. *Canto, música y danza precortesiana*. México, D.F.: Fondo de Cultura Económico and Instituto Nacional de Antropología e Historia. In press.
- MASON, BERNARD S. 1944. *Dances and stories of the American Indian*. New York: A. S. Barnes.
- MAYO, MARGOT. 1948. *The American square dance*. New York: Sentinel Books.
- MATIDA KASVO. 1938. *Odori* (Japanese dance). Tokyo: Board of Tourist Industry, Japanese Government Railways.
- MCALLESTER, DAVID P. MS. Comanche sign language. Paper in Ethnomusicology, at Columbia University, 1941.
- MEAD, MARGARET. 1949. *Coming of age in Samoa*. New York: Mentor Books. First published in 1928.
- . MS. "Dance as an expression of culture patterns," in *The Function of Dance in Human Society* (Second Seminar) (ed. FRANZISKA BOAS), New York, 1946.
- MOERDOWO, R. 1957. Dances in Indonesia. *Folklorist* 4:63-66.
- MOISEYEV, IGOR. 1951. *Tänze der Völker der Sowjetunion*. Berlin.
- . 1952. *Orosz Heptancsok*. Budapest.
- MOONEY, GERTRUDE X. 1957. *Mexican folk dances for American schools*. Coral Gables, Fla.: University of Miami Press.
- MÜLLENHOFF, K. 1871 (and later supplements). *Über den Schwerttanz*. Berlin.
- MURDOCK, GEORGE P., et. al. 1954. *Guía para la clasificación de los datos culturales*. New Haven and Washington, D.C.: Pan-American Union.
- NIELSEN, H. G. 1917. *Vore äldste Folkedanse*. 71 pp. text, 24 pp. music.
- . 1920. *Folkelig Vals*. 83 pp. text, 47 pp. music. Copenhagen.
- OKUNEVA, B. B. 1951. *Russkie Narodnye Chora i Tantsy*. Sophia.
- ONEGINA, T. D. 1938. *Moldavsky Tanets*. Moscow.
- POLLENZ, PHILIPPA. 1946. Some problems in the notation of Seneca dances. Unpublished M.A. thesis, Columbia University, New York. (Labanotation.)
- . 1949. Methods for the comparative study of the dance. *American Anthropologist*, n.s., 56:428-35.
- PROCA, VERA. 1956. Despre notarea dansului popular romnesc. *Revista de Folclor* 2, No. 1-2:135-71. Bucharest.
- . 1957. Despre notarea dansului popular romnesc. *Revista de Folclor* 2, No. 1-2:65-92.
- PROKOSCH, GERTRUDE. 1938. Rhythms of work and play. *Journal of Health and Physical Education* 9:294-97.
- PURDON, M. E. 1958. Ukrainian Cossack Company. *Folklorist* 4, No. 6:158-62.
- RHODES, WILLARD. 1956. On the subject of musicology. *Ethnomusicology Newsletter* 7:1-9.
- ROGERS, HELEN P. 1958. A complete record for the dance. *Dance Notation Record* 9, No. 1:5-6.
- SACHS, CURT. 1933. *Eine Weltgeschichte des*

- Tanzes*. Berlin: Reimer. (Huge bibliography.)
- , 1953. *Rhythm and tempo*. New York: Norton.
- SALZ, BEATE. 1955. *The human element in industrialization*. Memoir, American Anthropological Association, No. 85.
- SANTA ANA, HIGINIO VASQUEZ. 1940. *Fiestas y costumbres Mexicanas*. México, D.F.: Ediciones Botas.
- SCHMITZ, CARL A. 1955. *Balam: Der Tanz und Kultplatz in Melanesien*. Emsdetten, Westphalia: Lechte Verlag.
- SCHUSKY, ERNEST. 1957. Pan-Indianism in the eastern United States. *Anthropology Tomorrow* 6:116-23. Chicago: University of Chicago Anthropology Club.
- SEBILLO-B., MELA. 1935. *Mexican and New Mexican folk dances*. Albuquerque: University of New Mexico Press.
- SHAWN, TED. 1929. *Gods who dance*. New York: Dutton. (Valuable bibliography.)
- SHOMER, LOUIS. 1943. *Swing steps*. New York: Padell Book Co.
- SINGER, MILTON B. 1958. The great tradition in a metropolitan center: Madras. *Journal of American Folklore* 71, No. 281:347-88.
- SLOTKIN, J. S. 1955. An intertribal dancing contest. *Journal of American Folklore* 78, No. 268:224-28.
- , 1957. *The Menomini powwow*. Milwaukee Public Museum Publications in Anthropology No. 4.
- SOLARI, MARIA LUISA. 1958. Notación de la danza. *Revista Musical Chilena* 12, No. 58:42-58.
- SPECK, FRANK G. 1949. *Midwinter rites of the Cayuga longhouse*. Philadelphia: University of Pennsylvania Press.
- SPECK, FRANK G. and LEONARD BROOM. 1951. *Cherokee dance and drama*. Berkeley and Los Angeles: University of California Press.
- SPENCE, LEWIS. 1947. *Myth and ritual in dance, game and rhyme*. London: Watts.
- SPREEN, HILDEGARD L. 1949. *Folk-dances of South India*. New York: Oxford University Press.
- STURTEVANT, WILLIAM C. 1954. The medicine bundle and busks of the Florida Seminole. *Florida Anthropologist* 7, No. 2:31-70. (Bibliography.)
- Tantsi Narodov SSSR*. ("Folk Dances of the USSR.") 1955. Moscow: Iskusstvo.
- TAX, SOL. 1952. "Economy and technology," in *Heritage of Conquest* (ed. SOL TAX), pp. 43-75. Glencoe, Ill.: Free Press.
- THOMPSON, SITH (Ed.). 1953. *Four symposia on folklore*. Bloomington: Indiana University Press.
- THUREN, HJALMAR. 1908. *Folkesangen paa Färdörne*. Folklore Fellows Publications, Northern Series 2. 337 pp. Copenhagen. (Over 100 songs.)
- THURSTON, HUGH A. 1954a. *Scotland's dances*. London: G. Bell.
- , 1954b. What is a folk dance? *Folk Dancer* 1, No. 1:4-6.
- TITIEV, MISCHA. 1955. *The science of man*. New York.
- TOLMAN, BETH, and RALPH PAGE. 1937. *The country dance book*. New York: A. S. Barnes.
- TOMKINS, WILLIAM. 1929. *Universal Indian sign language*. San Diego, Calif.: Author.
- TSOUKALAS, NICHOLAS. 1956. *Spanish dancing: zapateado movements*. Detroit: Author.
- TULA. 1952. Therapeutic dance rhythms. *Dance Observer* 19, No. 10:117-18.
- TURLEY, FRANK. MS. The present-day Oklahoma fancy war dance. 1959.
- VEGA, CARLOS. 1952. *Las danzas populares argentinas, Vol. 1*. Buenos Aires: Ministerio de Educación de la Nación. (Comprehensive bibliography.)
- VENABLE, LUCY, and FRED BERK. 1959. *Ten folk dances in labanotation*. New York: Witmark.
- VISKI, KÁROLY. 1937. *Hungarian dances*. 193 pp. text, 34 pls. London and Budapest.
- VYCPALEK, JOSEF. MS. *Česke Tance, Czechoslovakia*. In press.
- WELTFISH, GENE. MS. "Patterns of work in primitive industry," in *The Function of Dance in Human Society* (Second Seminar) (ed. FRANZISKA BOAS), New York, 1946.
- WILDER, STAFFORD. 1940. The Yaqui deer dance. Unpublished M.A. thesis, University of Arizona, Tucson, Ariz. (Diagrams.)
- WILLIAMS, RALPH VAUGHAN. 1958. The English folk dance and song society. *Ethnomusicology* 2, No. 3:108-12.
- WISSLER, CLARK. 1916. General discussion of shamanistic and dancing societies. *Anthropological Papers of the American Museum of Natural History*, Vol. 2, Pt. 12.
- WOLFRAM, RICHARD. 1931. *Volkstanz—nur gesunkenes Kulturgut? Zeitschrift für Volkskunde*. Berlin.
- , 1933. *Die Frühform des Ländlers. Zeitschrift für Volkskunde*. Berlin.
- , 1934. Altersklassen und Männerbünde in Rumänien. *Mitteilungen der Anthropologische Gesellschaft in Wien* 64:112-28.
- , 1937. *Deutsche Volkstänze. Bilder der deutschen Volkskunde* (ed. A. SPAMER), Vol. 5. 49 pp. text, 44 pls. Leipzig, Germany.
- , 1951. *Die Volkstänze in Österreich und verwandte Tänze in Europa*. Salzburg: Müller. (Large bibliography.)
- , 1954. *Der Schwerttanz. Helleiner Heimatbuch*. (Series Heimat Österreich.) Graz, Drechsler.
- , 1956. European song-dance forms. *Journal of the International Folk Music Council* 8:32-35.
- , MS. *Schwerttanz Europas*. 800 pp. Three fascicles appeared Bärenreiterverlag, Kassel. (Diagrams of 30 dances.)
- ZHOHNITZKAYA, M. YA. 1956. *Yakutskie Tantsy*. Yakutsk, Siberia.
- ZODER, RAIMUND. 1938. *Der Deutsche Volkstanz. Deutsches Volkstum* 3:137-84. Berlin.
- , 1950. *Volklied, volkstanz und volksbrauch in Österreich*. Wien: Döblinger.

Projects

- CASTNER, RICHARD L. A history of traditional American country dancing, to 1800.
- CHILKOVSKY, NADIA. Observation and notation of national traits in effort behavior. (Laban Effort symbols.)
- CHILKOVSKY, NADIA, and Students of Philadelphia Musical Academy and Philadelphia Dance Academy. Notes on regional jazz dances. (Labanotation.)
- DELZA, SOPHIA. Notes on Chinese dances. (Labanotation.)
- GARCIA, JOSEFINA. Labanotation of Latin American dances.
- HOEBURGER, FELIX. Bibliography and critical inventory of folk dance publications in Europe.
- HOLM, WILLIAM. Reconstruction of Kwakiutl dances.
- KURATH, GERTRUDE P., and Dance Research Center Associates. *Ritual Drama of the American Indian*. (For *Dance Perspectives*).
- LATTIMORE, ALICE. Notes on mudras of India, on Balkan, Slavic, Greek and other folk dances. (Labanotation.)
- LAUBIN, REGINALD, and GLADYS LAUBIN.

- A historical study of American Indian dances.
- MARTI, SAMUEL, and G. KURATH. Manual of dance analysis. (For SAMUEL MARTI MS.)
- THURSTON, HUGH A. Dictionary of folk dance terms.
- WEST, LA MONT. American Indian sign language. Indiana University thesis.

Non-Commercial Films

- BOAS, FRANZ. Kwakiutl dances. University of Washington.
- CHILKOVSKY, NADIA and LEAH DILLON. Complete vocabulary of Hindu mudras. Philadelphia Dance Academy.
- DEAN, GETH, and VICTOR CARELL. Australian dances.
- DEHN, MURA. History of Jazz Dance.
- ENGLISH FOLK DANCE and SONG SOCIETY. English dances. Cecil Sharp House.
- FIRST, GEORGIA. Dances of Fox Indians. (Also slides.)
- GERSON-KIWI, EDITH. Wedding ceremonies and dances of Kurdistan Jews.
- IRISH FOLKLORE COMMISSION. Mummerys and other Irish dances.
- KAPLAN, SHIRLEY WIMMER. Folk dances of India.
- (a) Twenty-one dances during Republic Day Celebration, New Delhi, Jan. 1957. Partial notation of nine dances, from Assam, Himachal Pradesh, Kashmir, Kerala, Orissa, Uttar Pradesh. (600 ft. color; taped music expected from Sangeet Natak Akademi.)
- (b) Kandyan dance in Ceylon. (300 ft.; tape of drum and voice.)
- (c) Girls' dance from Ellora. (100 ft.; no tape.)
- KURATH, GERTRUDE P. Edited tapes and slide series at Dance Research Center, *inter alia*:
- (a) Michigan Indian dances. (150 ft.; tapes.)
- (b) Menomini dances. (100 ft.; tape.)
- (c) Santa Clara plaza dances. (150 ft.; tape.) Copy at Wenner-Gren Foundation.
- (d) Jazz dances of White and Negro teenagers of Ann Arbor. (100 ft.)
- MANSFIELD, PORTIA. Edited films. Copies, Perry-Mansfield School of Theater.
- (a) The Conchero dancers of Mexico. Sound, music art. by RAOUŁ GUERRERO. (Two reels: Background [10 min.], Ceremonies [18 min.])
- (b) Cowboy squares. (12 min.)
- (c) Southwest Indian dances (Tewa Pueblos, Acoma, Cochiti, Taos). (12 min.)
- (d) Nepalese dances. (Not edited.)
- MERRIAM, ALAN P. Ekonda, Africa. (Edited.)
- NICHOLLS, THAD. Yaqui Easter fiesta, Pascua, Arizona. (Edited.)
- PETER, ILKA, and HERBERT LAGER. Austrian "Tresteln."
- PINKERSON, FRANCES. Ceremonial dances of Mexico (Volador, Moros y Cristianos, Apaches, Pastorcitas, etc.). (400 ft.; edited.)
- POSPISIL, F. German Sword Dances.
- RAYE, ZELIA. Hawaiian dances. 40 King's Road, London.
- SHAWN, TED [3]. Dances of India, Java, Ceylon, Darjeeling, Tibet, Japan (1925-26), Australian Corroboree (1947), Bali, Philippine Moros, Oklahoma Indians, and others. List, Jacob's Pillow University of the Dance, Lee, Mass.
- STREHLOW, THEODOR G. H. Aranda and Loritja totemistic ceremonies, Australia.
- TURNER, ALONSO. West African journey.
- WOLFRAM, R. Norwegian "Springar" (1939).

TOWARD DISCOVERY BY COMMUNICATION:

The New Conference Center at Burg Wartenstein

THE WENNER-GREN FOUNDATION FOR ANTHROPOLOGICAL RESEARCH has announced policies for consideration of proposals of conferences and symposia to be held at its European Headquarters, Burg Wartenstein, Austria.

Established by the Foundation as an international conference center for anthropologists, Burg Wartenstein was opened on August 17, 1958, with a ceremony attended by anthropologists from Europe and America. An international Symposium on Current Anthropology was held immediately; and, in September, a symposium of Austrian anthropologists, which resulted in the book, *Beiträge Österreichs zur Erforschung der Vergangenheit und Kulturgeschichte der Menschheit*.

The four international symposia held at Burg Wartenstein in 1959 included "Quantitative Methods in Archaeology" and "Stability and Change in Thai Culture," both reported in January CURRENT ANTHROPOLOGY; "Rural Peoples of the Mediterranean" (March CURRENT ANTHROPOLOGY); and "Social Life of Early Man," organized by Sherwood L. Washburn, University of California, Berkeley, U.S.A. These helped set the conference pattern intended by the Foundation when it established the center. All of them were organized along interdisciplinary lines; based on papers prepared by participants, exchanged, and read in advance; and the conferences themselves were devoted to discussion rather than the reading of papers. The castle is available for such meetings, and the Wenner-Gren Foundation offers to subsidize them.

As reported in the Foundation's annual report for 1959, the policies are:

I. THEME

Theme should preferably be along interdisciplinary lines within anthropology and/or its related sciences:

Under this is meant that most or all of the classic sub-disciplines (ethnology, archaeology, physical anthropology, etc.) should be represented in the conference by subject and/or participating personnel. This policy, however, is not intended to eliminate the single sub-discipline provided the aim of the symposium has a valid inventory or stock-taking purpose. Undesirable are subjects which are termed isolationary on account of high specialization, narrow geographical or chronological limitation. It is a top desideratum that conferences should be of service and interest to the anthropological profession as a whole. Conference themes need not be restricted solely to the anthropological disciplines provided they have the potentiality and prospect of substantially contributing to anthropology. They can be based on such

as the classical disciplines, or any of the exact or natural sciences. (Mathematics, for example, could be a valid subject if it deals with statistics for anthropology.)

II. PROGRAM

No conference proposal can be entertained for approval upon title only. A tentative outline of program should contain suggested titles, the number of sessions contemplated, as well as the possible dates.

III. DATE

Careful consideration of suitable timing in scheduling date and running time of conference should be made. It is recommended that proposals for such international symposia be submitted for preliminary approval at least 12 to 15 months in advance of proposed date so that, if accepted, ample time would be allowed for invitations to be made and preparations to be carried out.

IV. PARTICIPANTS

Since the Foundation does not believe that any one nation has a monopoly on brains or intellectual capacity, the list of participants should be selected internationally and not restricted in total or in large part to a single country. Please note that Burg Wartenstein serves as European Headquarters of the Foundation; therefore conferences which have a majority of United States participants should, for financial reasons, be planned to meet in the United States unless the travel costs to Vienna can be obtained by the Organizing Chairman from outside agencies.

V. PAPERS

It is recommended that conferences should be planned to exclude the reading

of contributed papers during sessions. Instead, papers should preferably be written, duplicated, and distributed among the participants in ample time before the actual conference so that participants have the opportunity to read and study them before the meetings begin. The conference time, then, would be principally used for discussion only. Abstracts, if needed, can always be read by the authors during the symposium sessions to refresh the audience's memory.

VI. PUBLICATION

It is recommended that papers and results of discussion be considered for publication.

VII. COST

An approximate and reasonable estimate of expenses involved for participants and prime costs of publication is also needed. Please note that travel costs are at all times to be based upon the round trip economy or tourist air fare of each participant.

Suggested sources from which partial support for travel and publication can be obtained, and an indication by the Organizing Chairman of the aid he can render in this respect should be included in the proposal.

VIII. APPROVAL

Please bear in mind that the submission of a conference proposal does not automatically mean that the Board of Directors will approve it. For this reason, only tentative invitation to the participants can be made by the Conference Organizer. Upon approval of the Board of Directors, the Foundation itself will issue the final invitations.

Burg Wartenstein, bei Gloggnitz,
N. O. Österreich



The Human Relations Area Files

The Human Relations Area Files are a new kind of tool for cross-cultural research containing information on a representative sample of the world's societies. They are available for use by any qualified scholar at the seventeen member universities in the United States,* and are now being set up at the École Pratique des Hautes Études in Paris. A microfilm edition of the Files is available on a subscription basis to any interested organization.

What are "the Files"? Published or unpublished knowledge about a given society, selected by appropriate specialists, is reproduced on 5" x 8" slips, both in the original language and in English translation. The slips are classified and coded by trained researchers, using G.P. Murdock's *Outline of Cultural Materials*, which provides some 700 numerical categories covering all human activity. The coded material is duplicated and distributed to each of the member universities.

The Files on different areas vary greatly in size, from as many as 100,000 slips on China to about 2,000 on small non-literate societies. The total is about 1,250,000 slips, representing 300,000 original text pages. The Files include 170 societies, distributed as follows: Asia, 50; Africa, 15; Europe, 12; Middle East, 19; North America, 22; South America, 16; Russia, 18; and Oceania, 18. Currently, information about 10 tribal societies in Africa, including Yoruba, Somali, Mossi, Mongo, and Amhara, is being organized in file form. A grant just received from the National Institutes of Health (U.S.A.) will enable HRAF to round out its world sample with files on forty more pre-literate societies during the next two years.

Microfilm edition. This edition of the Files, together with a Gracombe model KE24 reader, is available at the subscription price of \$750 per year; 100,000 file pages will be filmed and distributed to subscribers each year. Files thus far microfilmed include Afghanistan, Aleut, Andamans, Aranda, Araucanians, Aymara, Aztec, Bemba, Buka, Crow, Hadhramaut, Hottentot, Iban, Iran, Jivaro, Lepcha, Ojibwa, Tallensi, Tiv, Toda, Trobriands, Tupinamba, Woleaians, and Yurok.

Publications. HRAF also has a publication program. Some forty titles in

seven continuing series have so far appeared. A second edition of Murdock's *Outline of World Cultures* was published in 1958, and contains revisions based on the work's use in classifying the Files since its first publication in 1954. Of special interest is the new index of tribal and ethnic names, with synonymies. Murdock's *Ethnographic Bibliography of North America* is also being brought up to date, and will probably be available in late 1960.

Some other recent publications are: *The Melanesians*, by R. H. Codrington; *The Indian Village Community*, by B. H. Baden-Powell; *Organization of Work: A Comparative Analysis of Production among Nonindustrial Peoples*, by Stanley H. Udy, Jr.; a bibliography, *Paleo-Siberian Peoples and Languages*, by Roman Jakobson and others; and five new volumes in the Survey of World Culture series, *Poland, Jordan, Iraq, Saudi Arabia, and Cambodia*. Surveys on China, S.S.S.R., Laos, India, and Indonesia are scheduled for publication in 1960.

For prices of the publications, and for further information, write to: Human Relations Area Files, Inc., Box 2054, Yale Station, New Haven, Connecticut, U.S.A. A Spanish edition of the *Outline of World Cultures* is available from Pan American Union, Washington, D.C., U.S.A.

Serial Publications

► **Distribution of the Viking Fund Publications in Anthropology**, formerly made through the American Anthropological Association, has been transferred to CURRENT ANTHROPOLOGY. Subsidized by the Wenner-Gren Foundation for Anthropological Research, the series of monographs reporting research in general anthropology was begun in 1942 under the editorship of Cornelius Osgood. Other editors have been Ralph Linton (1946-51), A. Irving Hallowell (1951-56), and Sherwood L. Washburn (1956-60). The new editor will be Sol Tax, and the monographs will be available far below cost to Associates in and subscribers to CURRENT ANTHROPOLOGY. At least two volumes will be published each year. The first is George M. Foster's *Culture and Conquest: America's Spanish Heritage*. Under consideration are *Quantitative Methods in Archaeology*, by Robert F. Heizer; *Social Structures in Southeast Asia*, by G. P. Murdock; and *Social Life of Early Man*, by S. L. Washburn.

Subscriptions to Viking Fund Publications in Anthropology are offered to Associates in CURRENT ANTHROPOLOGY at

a rate equivalent to the amount of the Associate's fee (e.g., in Argentina, 100 pesos; S.S.S.R., 20 rubles; U.S.A., \$2.00; all in addition to Associate's fee). For Regular or Special Rate subscribers to CURRENT ANTHROPOLOGY, the rate will be 50% of their present subscription, in addition to it (e.g., Regular subscribers in Czechoslovakia add 50 Kcs; in United Kingdom, £ 1/5/0).

Although publication is subsidized by the Wenner-Gren Foundation, complete authority for the selection of manuscripts and their preparation for publication rests with the editor, and all inquiries or manuscripts should be addressed to him. Since the series is published in English, manuscripts written in other languages should be translated before they are submitted for possible publication.

► With the *Biennial Review of Anthropology, 1959*, the Stanford University Press inaugurated a series in which widely scattered papers and monographs will be systematically described and summarized for anthropologists and other social scientists who wish to keep abreast of work in fields related to their own specialties. Edited by Bernard J. Siegel, the essays in this first volume cover research published since 1955 in five fields of anthropological interest: social and cultural change, physical anthropology, linguistics, social organization, and psychological dimensions of culture. Culture history (archaeology, ethnohistory, and historical ethnology) is excluded. The *Review* includes a chapter (by Lawrence Krader, U.S.A.) appraising recent trends in Soviet anthropology, and a special chapter drawing together the increasingly numerous and important cross-cultural studies of political behavior. Similar chapters are planned for subsequent volumes in the series. Copies of the *Review* are available at U.S.A. \$6.00 and may be ordered from Stanford University Press, Stanford, California, U.S.A.

► The Committee on Uralic Studies of the Graduate School, Indiana University, has established the first series in Uralic and Altaic studies to be published in the United States. The initial volume, *American Studies in Uralic Linguistics*, appeared in March, 1960. Thomas A. Sebeok is editor of the series, with Fred W. Householder, Jr., Felix J. Oinas, and Alo Raun the associate editors. Manuscripts of books, monographs, or extended articles about Uralic or Altaic peoples or languages may be sent to the Editor, Rayl House, Indiana University, Bloomington, Indiana, U.S.A. Inquiries about subscriptions may be sent to the same address.

* Chicago, Colorado, Cornell, Harvard, Hawaii, Indiana, Iowa (Iowa City), Michigan, North Carolina, Oklahoma, Pennsylvania, Princeton, Southern California, Southern Illinois (Carbondale), Utah, Washington (Seattle), and Yale.

1959 Viking Fund Medalists

The 1959 Viking Fund Medals and Awards for outstanding achievement in Anthropology were presented to Leslie A. White, University of Michigan, U.S.A., Irving A. Rouse, Harvard University, U.S.A., and William W. Greulich, Stanford University, U.S.A., at the annual dinner of the Wenner-Gren Foundation for Anthropological Research, held on March 4 at the Plaza Hotel, New York. Each Medalist received an award of \$1,000, and a gold-plated bronze medal, designed by Miguel Covarrubias and sculpted by René Paul Chambellan. Medalists are chosen annually by the American Anthropological Association, the Society for American Archaeology, and the American Association of Physical Anthropologists, each of which appoints a special committee to select its candidate.



In the thirteen years since 1946, when the first medals were presented to A. L. Kroeber, A. V. Kidder, and Franz Weidenreich, some of the best-known American scholars have been honored. Although the awards were established in the United States, and the recipients are chosen by U.S. societies, several anthropologists from abroad have been selected. These include Alfonso Caso, Instituto Indigenista, Mexico; Raymond A. Dart, University of the Witwatersrand, South Africa; Raymond Firth, University of London, England; W. E. Le Gros Clark, University of Oxford, England; and Henri V. Vallois, Musée de l'Homme, France.

RECIPIENTS OF VIKING FUND MEDALS AND AWARDS

	<i>American Anthropological Association</i>	<i>Society for American Archaeology</i>	<i>American Association of Physical Anthropologists</i>
1946	Alfred L. Kroeber	Alfred V. Kidder	Franz Weidenreich
1947	Robert H. Lowie	John O. Brew	Earnest A. Hooton
1948	John R. Swanton	Alex D. Krieger	Adolph H. Schultz
1949	George P. Murdock	Hallam L. Movius, Jr.	Wm. King Gregory
1950	Clyde K. Kluckhohn	Emil W. Haury	Wilton M. Krogman
1951	Ralph Linton	Frank H. H. Roberts, Jr.	Carleton S. Coon
1952	Julian H. Steward	Alfonso Caso	William L. Straus, Jr.
1953	Melville J. Herskovits	Gordon R. Willey	T. Dale Stewart
1954	Robert Redfield	Wm. Duncan Strong	William W. Howells
1955	A. I. Hallowell	J. Eric S. Thompson	W. E. Le Gros Clark
1956	Fred Eggan	Junius B. Bird	Mildred Trotter
1957	Margaret Mead	James B. Griffin	Raymond A. Dart
1958	Raymond W. Firth	Jesse D. Jennings	Henri V. Vallois
1959	Leslie A. White	Irving Rouse	William W. Greulich

Wanted

► Comments, references, and data about sex differences in the weight of bone. The average whole-body density is substantially lower in women than among men of the same age. Probably the higher fat content of the female body accounts for much of this difference, but a more precise answer requires more knowledge about the density of the non-fat part of the body. Specifically, is the male skeleton heavier than a female skeleton of the same stature? How great is the difference? Is the difference caused simply by greater size of the bones, or does it involve differences in bone mineralization and the relative amount of compact bone in the extremities? Muscles and viscera, the other major components of the non-fat part of the body, are unlikely to show

sex differences in density, but may differ when expressed as percentage of the skeletal weight.—Josef Brozek, Lehigh University, Bethlehem, Pa., U.S.A.

► . . . anxious to locate manuscripts by missionaries who were stationed in the New Britain and New Ireland region in

the early part of the twentieth century, especially those in German that include information on the languages. There are probably a fair number of these in German university libraries, but a complete list is not available.—Peter A. Lanyon-Orgill, 1701 Beach Drive, Victoria, B.C., Canada.

Scholarships and Fellowships

► Citizens of countries belonging to the Organization of American States, who have the necessary qualifications, are eligible to apply for fellowships in the new Inter-American Program for Advanced Training in Applied Social Sciences. Now under way in Mexico City, the Program is sponsored by the Pan American Union, with the co-operation of the government of Mexico, the Instituto Nacional Indigenista de Mexico, and other official organizations. The program is designed to train personnel who will return to their native countries and use their training as teachers, specialists, or administrators, to deal with social problems arising from rapid economic development. Fellowships, which are for two years, cover tuition, transportation to Mexico and return, and transportation for field trips, besides providing U.S.A. \$150 a month for living expenses (no allowances for dependents).

The course work is planned to give a solid theoretical base in anthropology and a broad view of contemporary social problems in Latin America. An eight-month period of supervised field work in problems of individual interest is also required.

Academic classes are held at the Escuela Nacional de Antropología e Historia in Mexico City, and are taught in part by the regular staff of the school. Special courses and seminars are also given by visiting professors. Since courses are conducted in Spanish, proficiency in Spanish is necessary; a reading knowledge of English is also required.

Two curricula are offered: one, for those holding an academic degree or its equivalent in anthropology or sociology; the other, for persons with a degree or its equivalent in an acceptable related field. Courses for anthropologists include advanced work in Social Anthropology, Theory of Social Organization, Social Problems of Latin America, Administration of Social Development Problems, and Field Methods and Research Design, which is integrated with field work. There are additional seminars on practical problems, as well as elective courses.

Inquiries and requests for fellowship applications should be addressed to: Division of Science Development (Social Sciences), Pan American Union, Washington 6, D.C., U.S.A. Applications for the group that will enter in March, 1961, must be received by October 15, 1960.

► The Australian National University (Canberra) invites applications from post-graduate students for research scholarships in Anthropology and Sociology, including Oceanic Linguistics. Scholarships are for an initial period of two years, and may be extended for a third year; scholars are expected to enroll for a Ph.D. degree. The present value of a scholarship is £A 865 per annum, but married students with dependent children may be given additional allowances. The University will make a contribution toward the cost of transportation to Canberra, and will give the same amount toward the return fare. Although applications are regularly considered in June and September, special consideration may be given those presented at other times. For particulars, write R. A. Hohnen, Registrar, Australian National University, Box 4, G.P.O., Canberra, A.C.T., Australia.

Institutions

► The COMMITTEE ON SCIENCE AND FREEDOM, an international organization founded in 1954 to promote academic freedom, has sponsored two study groups on "Freedom and Responsibility: the Role of the Scholar in Society." The first group met in Paris in 1956 to examine European and American traditions of academic freedom. The second meeting, which concerned universities in Africa and Asia, was held in April, 1959, in Tunis. It was attended by twenty-three participants from fourteen countries: Central Africa, France, India, Iran, Lebanon, Morocco, Nigeria, Pakistan, South Africa, Sudan, Tunisia, Turkey, United Kingdom, and the United States. A report of the proceedings has been issued as Bulletin No. 13 of the Committee on Science and Freedom, and may be obtained free of charge from the Secretary, Lime Cottage, 818, Wilmslow Road, Manchester 20, England.

► The INSTITUTE OF ANTHROPOLOGICAL INVESTIGATIONS OF THE CATHOLIC UNIVERSITY OF CHILE, Santiago, was founded in April, 1959, as part of the Faculty of Social and Economic Sciences of the University. Its members are Don Arturo Edwards de Ferrari, director; Don Horacio Zapater; and Sra. Ingeborg Lindberg, secretary; Dr. Emilio Willems and Dr. William Mullroy gave advice about its program. The two main aims of the Institute are to train anthropologists through a four-year course for which the "licenciado" degree is given, and to promote anthropological research. Research projects

include a study of share-cropping in Chile and an ethnohistorical investigation of transculturation among the Araucanian Indians from the sixteenth century to the present.

Future Meetings

Regional Seminar on the Museum as a Cultural Center in the Development of the Community

September 4–October 1, 1960
in Tokyo, Japan

During the present time of rapid political and economic change, the need of preserving elements of traditional culture while assimilating new influences presents a challenge to museums, particularly in countries that lack cultural institutions to aid community development. The influence of museums, however, depends on their developing programs that will attract the public. Many of the museums serving as cultural centers are using their collections to organize concerts, folk or experimental theater performances, and lectures on local and foreign art traditions. Such programs to meet the current challenge require new and heavy responsibilities from museum personnel.

Unesco, in co-operation with the Japanese National Commission for Unesco and the Japanese museums and their staffs, is sponsoring a seminar to study these and similar problems in detail. The meeting will draw upon the experience of three previous seminars on the educational role of museums, sponsored by Unesco with the co-operation of respective national authorities, which were held in Brooklyn, New York, U.S.A. (1952), Athens, Greece (1954), and Rio de Janeiro, Brazil (1958). The wide range of specialized museums in the Tokyo area will provide a basis for discussion and analysis of their potential roles as cultural centers.

The program for the Seminar will include:

- (1) Reports on museum activities in countries represented at the seminar;
- (2) Discussion and examination of different types of museums and their actual or potential contribution to educational and cultural programs;
- (3) Visits to historic sites and their associated museums outside the Tokyo area;
- (4) Discussion of community programs and international co-operation among museums.

Invitations to send participants to the Seminar have been extended by Unesco and the Japanese National

Commission to the following member states: Afghanistan, Australia, Cambodia, Canada, Ceylon, China, Federation of Malaya, France, India, Indonesia, Iran, Japan, Korea, Laos, Nepal, Netherlands, New Zealand, Pakistan, Philippines, Thailand, Union of Burma, United Kingdom, United States of America, Union of Soviet Socialist Republics, Viet-Nam; and the Singapore/British Borneo Group Associate Member.

The Seminar is intended for persons between the ages of thirty and forty-five, already launched on their careers, to whom international experience would be of help in furthering their work. The museum specialists chosen should be interested in expanding educational or community programs, while educators and specialists in community programs chosen should be interested in using the potential contribution of museums. During the period of attendance at the Seminar, participants will be provided with board, lodging, and local travel by Unesco and the Commission. Member States will be expected to cover participants' travel expenses from their countries of origin to Tokyo and return, as well as incidental expenses.

For further information, write to Mr. Hiroshi Daifuku, Museums and Monuments Division, UNESCO, Place de Fontenoy, Paris 7, France.

Congresses

First International Congress for the Study of the Folktale (Internationaler Kongress der Volkerzahlungs-forscher)

August 19-29, 1959, in Kiel, West Germany, and Copenhagen, Denmark

Congress Leader: Kurt Rank.

Participants represented twenty-six countries and four continents; attendance from eastern Europe was particularly notable. Sixty-three papers were presented, and 207 persons registered for the Congress.

The Congress:

Representing a broad approach to the study of the folktale, most papers reflected such archival work as collection and classification; a few were comparative and theoretical. Papers on systematic studies of type and motif, and on the relationship of literature to the folktale, were considered of special interest. Considerable discussion was provoked by the relationship of folklore to problems of history, depth psychology,

and the social and economic status of the tellers of folktales.

The final session established a series of committees to develop plans for a close-knit international body of professional folklorists. Committees were also formed to encourage co-operation among various national folklore societies and to develop criteria for the selection of fellows. Nomination of fellows is planned to start shortly. The next Congress is tentatively set for 1964 in Catania, Sicily.

Congress of Czechoslovak Anthropologists

September 21-26, 1959

in Bratislava, Czechoslovakia

Organizing Chairman: J. A. Valsik.

Participants were accommodated by the Slovak Academy of Sciences in a castle near Bratislava. Their countries of origin included Bulgaria, East and West Germany, Hungary, Mexico, Poland, and the United Kingdom.

The Congress:

The subjects of the papers presented at the Congress included: fossil cercopithecoids found in Czechoslovakia; investigations of historic populations; studies of growth in children and adults; studies of various types of athletes; and experimental work on posture. Publication has been assured by the Slovak Academy of Sciences. The meeting was successful, in that many valuable exchanges took place informally as well as during the conferences. (Information supplied by F. P. Lisowski.)

Conferences

Technology as a Backstop to Anthropology and Archaeology

December 28-30, 1959

in Chicago, Ill., U.S.A.

Held as part of Section H, American Association for the Advancement of Science. Arranged by Ray Winfield Smith, Archaeological Institute of America, Dublin, N. H., U.S.A.

Participants, and their papers:

Karl K. Turekian, Yale University, New Haven, Conn., U.S.A., "Trace Element Geochemistry as an Aid to Archaeology and Anthropology."

Walter C. McCrone, Walter C. McCrone Associates, Chicago, Ill., U.S.A., and Ian W. Cornwall, Institute of Archaeology, London, England, "Microscopy in Anthropology and Archaeology."

Edward V. Sayre, Brookhaven National Laboratory, U.S.A., "Study of An-

cient Objects by Means of Neutron Beams."

William J. Young, Museum of Fine Arts, Boston, Mass., U.S.A., "Technology from the Point of View of the Museum Laboratory."

William Campbell Root, Bowdoin College, Brunswick, Me., U.S.A., "Metallurgy in the Ancient World."

Robert N. Clayton, University of Chicago, Chicago, Ill., U.S.A., "Analysis by Means of Stable Isotope Fractionation."

Arnold M. Hartley, University of Illinois, Urbana, Ill., U.S.A., "Chemical Methods of Trace Analysis."

L. S. Birks, U.S. Naval Research Laboratory, Washington, D.C., U.S.A., "X-ray Spectroscopy as an Analytical Tool."

George C. Kennedy and Leon Knopoff, University of California, Berkeley, Calif., U.S.A., "The Application of Thermoluminescence to Problems of Archaeology."

E. T. Hall, Oxford University, Oxford, England, "Techniques under Development at the Research Laboratory for Archaeology and the History of Art."

Edwin A. Olson, Columbia University, New York, U.S.A., "Recent Refinements in the C-14 Technique."

Normal Peterson and R. E. Ogilvie, Massachusetts Institute of Technology, Cambridge, Mass., U.S.A., "Electron Microbeam Probe Studies of Art Objects."

Ray Winfield Smith, "Expanding Horizons of Anthropology and Archaeology: The Promise of Technology."

Discussion:

Specialists in technology attempted to illustrate applications of their respective approaches to the micro-analysis of archaeological materials. The techniques discussed serve not only for dating specimens, but often provide clues to the provenance and processes of manufacture of artifacts.

Turekian showed that the concentration of trace elements varies in materials from different regions, so that it can be used as an index of place of derivation, as well as of composition. Sayre demonstrated the use of scattering, diffraction, or activation of neutrons as means of analyzing these concentrations in any material without destroying the object under analysis. Hartley described chemical methods of trace analysis that require relatively simple laboratory equipment and procedures, and which can be linked in series for multiple testing of a single sample. Several papers were devoted to mechanical methods that afford expanded limits of detectability and range of precision through the use of elaborate equip-

ment. Clayton stressed these advantages in stable isotope fractionation; Birks showed similar values in x-ray spectroscopy, as did Peterson and Ogilvie in describing electron probes. Microscopic study was discussed as sometimes providing indications of techniques used in the working of metals or the preparation of ceramics.

In a critical assessment of Carbon-14

as a technique of absolute dating, Olson noted the use of isotopic enrichment by thermal diffusion to extend the range of age of materials to which it can profitably be applied. Kennedy and Knopoff described thermoluminescence as a measure of the age of some inorganic materials that have been subjected to high temperatures (notably fired clay and basalt). Hall's analysis

of proton-magnetometry can be used for the same purpose, although it has become known to archaeologists primarily as a means of locating sites and of mapping subterranean features. Potassium-argon and fluorine analysis were also discussed as potentially valuable technological approaches to dating archaeological remains. (Information supplied by DWIGHT B. HEATH.)

OUR READERS WRITE

Continued from page 194

Report of publications on the science of grave-excitation in Central Europe. Report on the at-present unpublished ancient and early historical grave-materials in Austria (skeletons and connected finds). AEMILIAN J. KLOIBER

Study of hill tribes which practise slash-and-burn cultivation. Research news from India. LALITA P. VIDYARTHI

Newly discovered rock-paintings in Austria. ERNST BURGSTALLER

Rock-paintings and engravings in Northeast and East Africa. HUBERT M. CHITTICK

Someone should sift ethnographies and law texts for concise and clear presentation of types of kinship systems in India. If Human Relations Area Files has already done this, it should be published. WILLIAM McCORMACK

Materials on the *Gestalt* concept in anthropological thought, and on mother-right in India and East Africa. BARON U. R. VON EHRENFELS

Everything which refers to indigenous linguistics of America and especially of Colombia. SERGIO ELIAS ORTIZ

Concerning the Negritos of the Philippines, the Proto-Malays of the Philippines, the Visayans of Central Philippines. MARCELINO N. MACEDA

In two years time, hope to have reference material on caste in East and Southeast Asia. Would suggest Prof. Morioka of the Tokyo University of Education for reference materials on studies of the family in Japanese.

WILLIAM H. NEWELL

Application of social anthropological methods to the study of urban communities. J. CLYDE MITCHELL

I would suggest a special section in CA for *terminology* (typology, etc.).

HANSJÜRGEN MÜLLER-BECK

Apart from what kinds of research have been, are being, and will be done where, it would be interesting to know details of teaching *curricula* at the various institutions. KENELM O. L. BURRIDGE

The "want-ad" section seems to me especially promising and welcome.

CARL SCHUSTER

Publication of photographs of objects or scenery, etc., with a view to more accurate identification by readers of CURRENT ANTHROPOLOGY.

PAULE MATHILDE LE SCOUR

Film being a powerful, sometimes dangerous, medium of mass-communication, I think it important that the use of film as a means to promote knowledge of non-European peoples be made a special research project.

A. A. GERBRANDS

... am compiling an ethnobotanical bibliography. SISTER M. INEZ HILGER

Much bibliographic and reference material covering Africa is already being compiled and collated under the aegis of the Pan-African Congress on Prehistory, e.g., catalogue of world collections of non-Negro African skeletal material; atlas of prehistoric sites and of fossil man in Africa. PHILLIP V. TOBIAS

Prehistoric bibliography of West Africa.

OLIVER DAVIES

I have started assembling: Bibliography of physiological anthropology; Bibliography of hunting and trapping techniques among extra-European peoples.

FRANÇOIS BOURLIERE

Yugoslav ethnology, especially bibliography concerning family, kinship, village life. MILENKO S. FILIPOVIĆ

Bibliography (annotated) of Australian aboriginal peoples and cultures, past and present. JANE C. GOODALE

Sub-fields of Anthropology

The cover-symbol of CURRENT ANTHROPOLOGY indicates the range of the anthropological sciences by listing seven sub-fields—Archaeology, Prehistory, Linguistics, Folklore, Ethnology, Social Anthropology, and Physical Anthropology. Noting that this particular selection was arbitrary, the Editor asked Associates to suggest other choices that could give a more definitive representation.

Of 800 Associates who wrote to the Editor, 117 commented on the symbol. Whether or not the 643 by silence indicated approval, of the 117 who commented only twenty-nine stated approval of the present form of the symbol, while eighty-eight were dissatisfied. Of these eighty-eight, seven Associates objected to the prominence of Antarctica on the map, the spacing of type, or the retention of "a" in Archaeology.

The eighty-one remaining Associates are concerned with the problem of the sub-fields as depicted on the symbol.

Criticism of the sub-fields included in the symbol shows the following distribution:

(1) No objections are raised to the inclusion of Linguistics or of Physical Anthropology.

(2) The inclusion of Archaeology is questioned by only one Associate (India), who considers archaeological material from historical periods beyond the scope of anthropological sciences.

(3) One Associate (U.S.A.), holding that, to many, Ethnology is almost synonymous with Social Anthropology, suggests that Ethnography be substituted.

(4) Three Associates (Hungary, Spain, U.S.A.) consider Folklore part of Ethnology (and Social Anthropology) and propose its elimination. The geographic spread of this group might indicate that its position is widely held.

(5) The deletion of Prehistory is urged by six Associates (East Africa, India, Spain, U.S.A.), five of whom think its distinction from Archaeology unnecessary.

(6) Criticism of the inclusion of Social Anthropology is particularly extensive (eight Associates) and widespread (Japan, Mexico, Netherlands, Switzerland, U.S.A.); it is generally considered part of Cultural Anthropology.

Physical Anthropology, Linguistics, and Archaeology, then, seem to be accepted as clearly defined sub-fields of comparable importance. Extreme variation in the definition of Ethnology is shown, and many Associates do not consider it equivalent to Cultural Anthropology. Neither Folklore nor Prehistory is entirely accepted as an independent sub-field—both are regarded by some as branches within Ethnology and Archaeology, respectively; and there seems to be strong resistance to the inclusion of Social Anthropology as distinct from Cultural Anthropology, although this attitude in part can be attributed to the absence of the latter in the list.

A separate issue, that of the names given sub-fields, is raised by several Associates. Considerable dissatisfaction with the term Physical Anthropology is indicated by seven replies from Associates who prefer Biological Anthropology (U.S.A.), Anthropobiology (Hungary), or Human Biology (U.S.A.). In addition, one Associate (Wales) wishes to substitute Folklife for Folklore.

The cover-symbol is also criticized for omitting important sub-fields. These omissions, and the number of Associates wanting each included, are as follows:

Art (4—Belgium, Sweden, Switzerland, U.S.A.)

Applied Anthropology (3—Mexico, U.S.A.)

Cultural Anthropology (11—Australia, Japan, Netherlands, Spain, Switzerland, U.S.A.)

Cultural Change (1—U.S.A.)

Cultural History (1—U.S.A.)

Culturology (1—U.S.A.)

Ethnic Migrations (1—Australia)

Ethnography (3—U.S.A.)

Ethnohistory (2—U.S.A.)

Ethnomusicology (1—U.S.A.)

Ethnopsychology (1—Austria)

History of Non-Literate Peoples (1—Germany)

Human Genetics (1—Canada)

Mythology (1—India)

Primatology (2—England, U.S.A.)

Religion (1—Sweden)

Social Geography (1—Germany)

Sociology (3—Austria, India, Mexico)

Technology (1—Italy)

This diversity is somewhat reduced by a tendency for suggestions to cluster about certain centers of dissatisfaction. The most apparent of these, of course, is the omission of the term Culture from the list of sub-fields; for, besides the eleven Associates who ask that Cultural Anthropology be included, the same objection is raised by Associates proposing slightly different solutions (e.g., Culturology and Ethnography), and it seems to underlie several of the broader revisions noted below.

Several replies suggest that the list is considered deficient because it does not fully express the historical aspect of Anthropology. A third major reservation is that the list seems not to recognize the study of literate societies; although this point is explicitly made by only one Associate, who proposes Culture Change to remedy the omission, it underlies several other suggestions.

It is clear that there is extreme disagreement about definitions. Thus, Ethnology is often considered historical, and as often is called non-historical. Similarly, Art is sometimes considered part of Ethnology, and sometimes given an independent status.

A number of Associates offer various alternatives to listing sub-fields at all:

(1) Two Associates (U.S.A.) suggest that subject-names be substituted for the names of sub-disciplines. Such a listing, for instance, could be Society, Culture, the Individual, Environment, and History.

(2) Others would use categories broader than sub-fields. The most frequently chosen (4—Spain, 1—U.S.A.) classification of this type is a bipartition of Anthropology into Physical and Cultural. One Associate (South Africa) suggests Physical and Social Anthropology. Other suggestions are: Cultural, Social, Historical, and Biological Studies of Man and His Works (U.S.A.); Spiritual, Social, and Physical Anthropology (Austria); Anthropology, Folklore, Linguistics, and Archaeology (East Africa); Man and His Works (U.S.A.); The Sciences of Humanity and Its Behaviour (India); Homo Sapiens in Review (U.S.A.); and ?Whence—MAN—Where? (South Africa). One Associate (U.S.A.) offers a new design symbolizing the cultural, biological, scientific, and historical polarities noted by the Editor.

(3) Replacement of anthropological categories by an appropriate motto or slogan is urged by eight Associates, three of whom (Germany, India, U.S.A.) asked for *Nihil Humanum Me Alienum Puto*. Others are *Notitia Hominum Studio Hominum* (U.S.A.); *Man is the Measure of All Things* (Spain); *The Proper Study of Mankind is Man* (U.S.A.); *Adam and Eve Before and After the Garden of Eden* (India); and (U.S.A.) the Yoruba proverb *pípé làá pé gbǫ̀n, a kí i pé gò*, "by being complete (in numbers), we shall attain wisdom; we shall not be (at once) complete and foolish."

(4) Perhaps in response to the Editor's remark that it would be better if words could be avoided, four Associates (Canada, Mexico, U.S.A.) suggest that no words be used. Three other Associates (Central Africa and U.S.A.) would substitute symbols.

Publications Received

The Editor wishes to acknowledge with thanks the receipt of the publications listed below. In future issues we shall continue this column as a means of acknowledging the books, reprints, and serial publications sent to us by our readers, and in the hope that these listings will be valuable as a sample of recent anthropological literature, and as a reference tool.

In order to keep the list current, we include only material published within the last three years. To make our listings more accurate and serviceable, each publication should include on the cover or title page complete information (with date, city, etc.), translated into English, and, where necessary, transliterated into roman script.

Books and Offprints

- AMES, DAVID W., Belief in "witches" among the rural Wolof of the Gambia. *Africa, Journal of the International African Institute* (1959) 29:263-73.
- AMES, DAVID W., and BURTON R. FISHER, The Menominee termination crisis: Barriers in the way of a rapid cultural transition. *Human Organization* 18, No. 3: 101-11.
- BARNETT, H. G., *Being a Palauan*. Case Studies in Cultural Anthropology (ed. GEORGE and LOUISE SPINDLER). 87 pp. New York: Henry Holt, 1960. \$1.25.
- BASTIDE, ROGER, *América Latina en el espejo de su literatura* ("Latin America as mirrored by its literature"). Cuadernos del Seminario de Integración Social Guatemalteca (1959) Ser. 1, No. 3. 36 pp.
- BEATTIE, JOHN, *Bunyoro, an African kingdom*. Case Studies in Cultural Anthropology (ed. GEORGE and LOUISE SPINDLER). 86 pp. New York: Henry Holt, 1960. \$1.25.
- BÉLA, GUNDA, Prehiztorikus jellegű őrlőkővek a Kárpátokban ("Milling stones of prehistoric type in the area of the Carpathians"). *Közlemények a debreceni Kossuth Lajos Tudományegyetem Néprajzi Intézetéből* (1958), No. 11. 19 pp. English summary.
- , Műveltségi áramlatok és társadalmi tényezők ("Cultural trends and social factors"). *Közlemények a debreceni Kossuth Lajos Tudományegyetem Néprajzi Intézetéből* (1959), No. 14. 12 pp. Russian and German summaries.
- BELITSER, V. N., *Ocherki po Etnografii Narodov Komi XIX-Nachalo XX V* ("Essays on the ethnography of the peoples of Komi, nineteenth century and the beginning of the twentieth"). 392 pp. Moscow: Akademii Nauk S.S.S.R., 1958.
- BERGEMANN, HANS-HUGO, Die philosophischen Grundlagen der lamaistischen Medizin in der Schau des Zahnarztes ("The philosophical basis of Lamaistic medicine as seen by a dental surgeon"). *Abhandlungen und Aufsätze aus dem Institut für Menschen- und Menschheitskunde*, Augsburg (1958) No. 54: 161-73.
- BLANC, ALBERTO CARLO, Verso un nuovo umanesimo ("Towards a new humanism"). *Annali della Pubblica Istruzione* (1958) 4:645-47.
- BORHEGYI, STEPHEN F. DE, *Cultura folk y cultura compleja en el área maya meridional* ("Folk culture and complex culture in a southern Maya area"). Cuadernos del Seminario de Integración Social Guatemalteca (1959) Ser. 1, No. 5. 31 pp.
- , Pre-Columbian cultural connections between Mesoamerica and Ecuador. *Middle American Research Institute Publication* (1959) 18:141-56.
- , The composite or "assemble-it-yourself" censer: A new lowland Maya variety of the three-pronged incense burner. *American Antiquity* (1959) 25:51-58.
- BRASCH, G. E. J. B., Le paternalisme: Une doctrine belge de politique indigène (1908-1933) ("Paternalism: A Belgian doctrine of indigenous politics"). *Revue de l'Institut de Sociologie de l'Université Libre de Bruxelles*, 1957:191-217.
- , Quelques expériences d'action sociale dans divers pays en voie de développement ("Some experiments in social action in several countries in the course of development"). *Revue de l'Institut de Sociologie de l'Université Libre de Bruxelles*, 1958:731-75.
- , Le facteur racial dans les relations humaines ("The racial factor in human relations"). *Bulletin de la Chambre du Commerce et de l'Industrie du Katanga*, Elisabethville (1959) No. 207:1-5; No. 208:4-9.
- , The Solvay Institute of Sociology in Belgian Africa. *International Social Science Journal*, UNESCO, 1959:237-50.
- BROWN, PAULA, and H. C. BROOKFIELD, Chimbu land and society. *Oceania* (1959) 30:1-75.
- BRUNNER-TRAUT, EMMA, The rise of consciousness in ancient Egypt. *Universitas*, Quarterly English Language Edition (1959) 3:71-78.
- BUETTNER-JANUSCH, JOHN, Natural selection in man: The ABO(H) blood group system. *American Anthropologist* (1959) 61:437-56.
- CÁMARA BARBACHANO, FERNANDO, *Colonización interna de Yucatán* ("Interior colonization of the Yucatán"). Instituto Yucateco de Antropología e Historia, Instituto Nacional de Antropología e Historia México (1958) 1. 45 pp.
- , "La población, problemas antropológicos y culturales" ("Population, anthropological and cultural problems"), in *Los Recursos Naturales del Sureste y su Aprovechamiento* (ed. ENRIQUE BELTRAN) Pt. 2, Vol. 3, Ch. 6. México, D. F.: Instituto Mexicano de Recursos Naturales Renovables, 1959.
- CASTAÑEDA PAGANINI, RICARDO, *La cultura tolteca-pipil de Guatemala*. 99 pp. Guatemala: Ministerio de Educación Pública, 1959.
- CHATTOPADHYAY, K. P., How Korkus live. *Journal of the Asiatic Society, Science* (1957) 22:99-138.
- , On polyandry. *Journal of the Asiatic Society, Science* (1957) 22:163-91.
- , Santal sibs—Their traditional history and observed intermarriage frequencies. *Proceedings of the National Institute of Sciences of India* (1957) 23, B:35-41.
- (Ed.), *Study of changes in traditional culture* (Proceedings of Conferences held by the University of Calcutta in Co-operation with UNESCO). Calcutta: University of Calcutta, 1957.
- , Bibliography on prehistory, physical anthropology and cultural anthropology from 1938 to 1950. MS.
- COMAS, JUAN, and SANTIAGO GENOVES T., *Paleoantropología y evolución, Varía I*. Universidad Nacional Autónoma de México Cuadernos del Instituto de Historia, Ser. Antropológica (1959) 6. 47 pp.
- COMHAIRE, JEAN, and WERNER J. CAHNMAN, *How cities grew: The historical sociology of cities*. 141 pp. Madison, N.J.: Florham Park Press, 1959. Multilith.
- COMHAIRE-SYLVAIN, SUZANNE, and JEAN COMHAIRE-SYLVAIN, L'enregistrement des naissances et décès comme source d'information ethnographique à Kenscoff, Haïti ("Registry of births and deaths as a source of ethnographic information at Kenscoff, Haïti"). *Revue de l'Institut de Sociologie de l'Université Libre de Bruxelles*, 1959:411-23.
- COTTER, JOHN L., *Archeological excavations at Jamestown, Virginia*. Archeological Research Ser. 4. 299 pp. Washington, D.C.: National Park Service, U. S. Department of the Interior, 1958.
- COULT, LYMAN H. JR., with the assistance of KARIM DURZI, *An annotated research bibliography of studies in Arabic, English, and French of the fellah on the Egyptian Nile, 1798-1955*. 144 pp. Coral Gables, Fla.: University of Miami Press, 1958.
- CRIST, RAYMOND E., Rice culture in Spain. *Scientific Monthly* (1957) 84:66-74.
- , Ethnogeography—Pile-dwellers and coconut culture in the Laguna de Sinauca, Venezuela. *Journal of the Washington Academy of Sciences* (1958) 48: 380-86.
- , The land and people of the Guajira Peninsula. *Annual Report, Smithsonian Institution*, 1957, Smithsonian Publication 4324 (1958) :339-55, with 10 pls.
- CRIST, RAYMOND E., and ERNESTO GÜHL, Pioneer settlement in eastern Colombia. *Annual Report, Smithsonian Institution*, 1956, Smithsonian Publication 4282 (1957):391-414.
- DAVIS, KINGSLEY, The myth of functional analysis as a special method in sociology and anthropology. *American Sociological Review* (1959) 24:757-72.
- DIXON, KEITH A., *Ceramics from two pre-classic periods at Chiapa de Corzo, Chiapas, Mexico*. Papers of the New World Archaeological Foundation, Orinda, Cal. (1959) Publication 4, No. 5. 52 pp. \$2.00.
- DOSTAL, WALTER, Ein Beitrag zur Frage des religiösen Weltbildes der frühesten Bodenbauer Vorderasiens ("A contribution to the question of the religious view of life of the earliest 'Bodenbauer' of the Near East"). *Archiv für Völkerkunde* (1957) 12:54-109.
- DUNNING, R. W., Rules of residence and

- ecology among the Northern Ojibwa. *American Anthropologist* (1959) 61:806-16.
- . *Social and economic change among the Northern Ojibwa*. 217 pp. Toronto: University of Toronto Press; London: Oxford University Press, 1959. \$5.50.
- . Ethnic relations and the marginal man in Canada. *Human Organization* 18:117-22.
- EDMONSON, MUNRO S., The Mexican truck driver. *Middle American Research Institute Publication* (1959) 25:73-88.
- EPHIMOV, A. V., *Ocherki Istorii U.S.A.* ("Essays on the history of the U.S.A."). 438 pp. Moscow: State Pedagogical Publishing House, Ministry of Education and Culture, 1958.
- EPHIMOV, A. V., and S. A. TOKAREV (Eds.), *Narody Ameriki* ("The peoples of America"). Vol. I. 671 pp. Moscow: Akademii Nauk S.S.S.R., 1959.
- FAY, GEORGE E., *Handbook of pottery types of Nayarit, Mexico*. Instituto Interamericano de Denton, Tex., Miscellaneous Papers, Archaeological Ser. (1959) 1. Multilith.
- FETTER, VOJTĚCH, and JINDŘICH DITTRICH, Kefalometrie, Jako Diagnostická Pomůcka Při Léčení Patologických Lebečních Deformit ("Cephalometry as a diagnostic aid in the therapy of pathological deformities of the head"). *Průhled Anthropologický* (1958) 24:97-108. With English and Russian summaries. Distributor: Anthropologický Ústav, University Karlov, Albertov 6, Prague.
- FORCE, ROLAND W., Palauan money: Some preliminary comments on material and origins. *Journal of the Polynesian Society of Wellington* (1959) 68:40-45.
- FOWLER, MELVIN L., *Summary report of Modoc Rock Shelter 1952, 1953, 1955, 1956*. State of Illinois Report of Investigations (1959) 8. 72 pp.
- FREYRE, GILBERTO, *En torno a algunas tendencias actuales de la antropología* ("Concerning some present tendencies in anthropology"). Cuadernos del Seminario de Integración Social Guatemalteca (1959) Ser. 1, No. 2. 39 pp.
- FRIEDL, ERNESTINE, Dowry and inheritance in modern Greece. *Transactions of the New York Academy of Sciences* (1959) Ser. 2, 22:49-54.
- GAJECKI, JÓZEF (Ed.), *Polski Atlas Etnograficzny, Zeszyt Próbný* ("Polish Ethnographic Atlas, Trial Issue"). 66 pp. With English translations. Wrocław: Polska Akademia Nauk, 1958. Distributors: Polska Akademia Nauk, Nowy Świat 72, Warsaw.
- GENOVES T., SANTIAGO, *Diferencias sexuales en el hueso coxal* ("Sexual differences in the coxal bone"). Universidad Nacional Autónoma de México Publicaciones del Instituto de Historia (1959) Ser. 1, No. 49. 440 pp.
- GOLDMAN, IRVING, Evolution and anthropology. *Victorian Studies*, Sept. 1959: 55-75.
- GOODY, JACK, The mother's brother and the sister's son in West Africa. *Journal of the Royal Anthropological Institute* (1959) 89, Pt. 1:61-88.
- HALLOWELL, A. IRVING, The backwash of the frontier: The impact of the Indian on American culture. *Annual Report, Smithsonian Institution*, 1958, Smithsonian Publication 4368 (1959):447-72. *Handbook of South American Indians*, Vol. 7: Index. Bureau of American Ethnology Bulletin 143. 286 pp. Washington D.C.: U. S. Government Printing Office, 1959. \$2.00.
- HART, C. W. M. and ARNOLD R. PILLING, *The Tiwi of North Australia*. Case Studies in Cultural Anthropology (ed. GEORGE and LOUISE SPINDLER). 118 pp. New York: Henry Holt, 1960. \$1.25.
- HASELBERGER, HERTA, Die Wandmalerei der afrikanischen Neger ("Mural Paintings of the African Negro"). *Zeitschrift für Ethnologie* (1957) 82:209-34.
- HENSEL, WITOLD, and ALEKSANDER GIEYSZTOR, *Archaeological research in Poland*. 75 pp. Warsaw: Polonia Publishing House, 1958.
- HOEBEL, E. ADAMSON, *The Cheyennes, Indians of the Great Plains*. Case Studies in Cultural Anthropology (ed. GEORGE and LOUISE SPINDLER). 103 pp. New York: Henry Holt, 1960. \$1.25.
- L'Homme et l'Eau ("Man and water"). Brochure of an exhibit of Club des Explorateurs. 22 pp. Paris: La Société des Explorateurs Français, 1960.
- HYDITFELDT, ARILD, *Teotl and *Ixiptlatl, some central conceptions in ancient Mexican religion, with a general introduction on cult and myth*. 182 pp. with Danish summary. Copenhagen: Munksgaard, 1958.
- Informator Nauki Polskiej* ("Directory of Polish science"). 306 pp. Warsaw: Państwowe Wydawnictwo Naukowe, 1958.
- IRIBARREN CH., JORGE, with the assistance of HANS NIEMEYER, and CARLOS CAMPBELL, *Arqueología en el valle de Copiapo*. *Revista Universitaria de la Universidad Católica de Chile* (1958) 63:167-95.
- IRVINE, F. R., *Bibliography of wild food plants of United States Indians*. Bureau of American Ethnology SIL-231. 26 pp. Washington D.C.: Smithsonian Institution. Multilith.
- ISHIDA EIICHIRO, *The Island of Women*. *Japan Quarterly* (1957) 4, No. 4. In English.
- , World history and cultural anthropology. *The Memoirs of The Institute for Oriental Culture* (1957), No. 12. In Japanese, with English summary.
- , What is cultural anthropology? A dialogue. *Keishi Review* (1957) 21:127-34. In Japanese, with English summary.
- , Historical materialism and cultural anthropology, with special reference to the structure of culture and human nature (English summary). *Japan Science Review: Literature Philosophy and History* (1958) 9:68-71.
- JARCHO, SAUL, Origin of the American Indian as suggested by Fray Joseph de Acosta (1589). *Isis* (1959) 50, Pt. 4:430-38.
- JEFFREYS, M. D. W., Male/female birth ratio of Europeans in West Africa. *South African Medical Journal* (1957) 31:1316-18.
- , Review of: *Dictionary of anthropology* by C. WINICK (London: Peter Owen, 1957). *African Studies* (1957) 16: 245.
- , Columbus visits the Gold Coast. *International Anthropological and Linguistic Review* (1957-1958) 3:1-5.
- , No purpose in life unless man invents one. *The Forum* (1958) 7, No. 2: 38-39.
- , When was Ilc Ife founded? *The Nigerian Field* (1958) 23, No. 1:21-23.
- , The weird sisters in Macbeth. *English Studies in Africa* (1958) 1:43-54.
- , Review of: *The travels of Leo Rozmital*, transl. and ed. MALCOLM LETTS (Cambridge: Cambridge University Press, 1957). *African Studies* (1958) 17: 135-36.
- , Braima alias Abraham-A study in diffusion. *Folklore* (1959) 70:323-33.
- KISLYAKOV, N. A., and A. I. PERSHITS (Eds.), *Narody Peredney Azii* ("The peoples of the Asian border"). 614 pp. Moscow: Akademii Nauk S.S.S.R., 1959.
- Konference Československých Anthropologů na Kokorině, 1957* ("[Second] Conference of Czechoslovakian Anthropologists at Kokorine, 1957"). 210 pp. Prague Společnost Národního Musca, 1958.
- KOVÁCS, F., Ist das Ungarische Zahlwort 'Húsz' 'Viginti' eine Zusammensetzung? ("Is the Hungarian numeral 'Húsz' 'Viginti' a compound?"). *Acta Linguistica of the Akademiae Scientiarum Hungaricae* (1958) 8:343-60. With Russian summary.
- KURATH, GERTRUDE P., Game animal dances of the Rio Grande Pueblos. *Southwestern Journal of Anthropology* (1958) 14: 438-48.
- , Blackrobe and Shaman: The Christianization of Michigan Algonquians. *Papers of the Michigan Academy of Science, Arts, and Letters* (1959) 44: 209-15.
- , La coreología, ciencia folklórica de la danza. *Folklore Americas* (1959) 19, No. 2:7-22.
- LESLIE, CHARLES (Ed.), *The social anthropology of Middle America*. Alpha Kappa Delta, Special Issue (1960) 30, No. 1. 67 pp.
- LEWIS, OSCAR, *Tepoztlán: Village in Mexico*. Case Studies in Cultural Anthropology (ed. GEORGE and LOUISE SPINDLER). 104 pp. New York: Henry Holt, 1960. \$1.25.
- LIPSCHUTZ, A., Socio-economic aspects of religion with special reference to America. *Opuscula Ethnologica Memoriae Ludovici Biro Sacra of the Akademiai Nyomda Budapest*, 1959:137-58.
- LOWE, GARETH W., and CARLOS NAVARRETE, Research in Chiapas, Mexico. *Papers of the New World Archaeological Foundation, Orinda, Cal.* (1959) Publication 3, Nos. 1-4. \$4.00.
- MANGELSDORF, PAUL C., Reconstructing the ancestor of corn. *Proceedings of the American Philosophical Society* (1959) 102:454-63.
- MANGELSDORF, PAUL C., and ROBERT G. REEVES, *The origin of corn: Five papers commemorating the Darwin Centennial*. Botanical Museum Leaflets (1959) 18, Nos. 7-11.
- MARTINEZ PAREDEZ, DOMINGO, *Un continente y una cultura, unidad filológica de la America prehispánica*. 125 pp. México, D.F.: Poesía de America, 1960.
- MAYER-OAKES, WILLIAM J., A stratigraphic excavation at El Risco, Mexico. *Proceedings of the American Philosophical Society* (1959) 103:332-73.
- MENDELSON, E. MICHAEL, *Los Mayas del Altiplano*. Cuadernos del Seminario de Integración Social Guatemalteca (1959) Ser. 1, No. 6. 21 pp.
- MILLER, WALTER R., Implications of urban lower-class culture for social work. *The Social Service Review* (1959) 33:219-36.
- MINTZ, SIDNEY W., Historical sociology of the Jamaican church-founded free village system. *De West-Indische Gids* (1958) 38:46-70.
- , Labor and sugar in Puerto Rico and in Jamaica, 1800-1850 (with comment by ELSA V. GOVEIA). *Comparative Studies in Society and History* (1959) 1: 273-83.
- NARR, K. J., Die Abstammungsfrage im Licht der Kulturgeschichte ("The question of the origin [of the species] in relation to the history of civilization"). (Journal not indicated).
- NEWMAN, THOMAS M., Tillamook prehistory and its relation to the Northwest Coast culture area. Unpublished Ph.D. dissertation, University of Oregon, Eugene, Ore., 1959. Multilith, 100 copies.

- NOVAL, JOAQUIN. *Tres problemas de la educación rural en Guatemala*. Cuadernos del Seminario de Integración Social Guatemala (1959) Ser. 1, No. 1. 43 pp.
- PAL, AGATON P., et al., *Silliman University Community Development Program, First Report*. 142 pp. Dumaguete City, Philippines: Silliman University, 1959.
- PIRLOT, YVETTE. Une expérience d'action sociale dans un milieu urbain au Congo Belge ("An experiment in social action in an urban area in the Belgian Congo"). MS, multilith.
- POZAS, RICARDO. Los problemas sociales en el proceso urbanístico de Ciudad Sahagún ("Social problems in the urbanization of Ciudad Sahagún"). *Ciencias Políticas y Sociales* (1958) 4:227-70.
- . *Chamula, un pueblo indio de los Altos de Chiapas* ("Chamula, an Indian village in the Hills of Chiapas"). Memorias del Instituto Nacional Indigenista, México, D.F. (1959) 8. 206 pp.
- Proceedings of the Forty-Sixth Indian Science Congress, Delhi, 1959, Pt. IV: Late abstracts, discussions, list of members and index*. Calcutta: Indian Science Congress Association, 64 Dilkhusa Street.
- RANTASALO, A. V., *Einige Zaubersteine und Zauberpflanzen im Volksaberglauben der Finnen* ("Some magic stones and magic plants in the popular superstitions of the Finns"). FF Communications of the Academia Scientiarum Fennica (1959) 71, No. 176. 78 pp.
- RAPOSO FONTENELLE, L. F., Aimerés, análise antropológica de um programa de saúde ("Aimerés, an anthropological analysis of a health program"). Rio de Janeiro: D.A.S.P. Serviço de Documentação, 1959.
- REINA, RUBEN E., *Continuidad de la cultura indígena en una comunidad guatemalteca* ("Continuity of the indigenous culture of a Guatemalan community"). Cuadernos del Seminario de Integración Social Guatemala (1959) Ser. 1, No. 4. 28 pp.
- RILEY, CARROLL L., and JOHN HOBGOOD, A recent nativistic movement among the southern Tephuan Indians. *Southwestern Journal of Anthropology* (1959) 15: 355-60.
- SAPORTA, SOL., and THOMAS A. SEBEOK, "Linguistics and content analysis," in *Trends in Content Analysis*, pp. 131-50. Urbana: University of Illinois Press, 1959.
- SARANA, GOPALA, A few comments on some of Radcliffe-Brown's basic concepts. *Eastern Anthropologist* 12:202-209.
- SCHUSTER, MEINHARD, "Die Soziologie der Waika," in *Proceedings of the Thirty-Second International Congress of Americanists, Copenhagen, 1956*, pp. 114-22. Copenhagen: Munksgaard, 1957.
- SEBEOK, THOMAS A., *The Mari region, USSR (Area and ethnic analyses)*. Arctic, Desert, Tropic Information Center Publication G-109. 31 pp., 8 figs. Research Studies Institute, Air University, n.d.
- SHIRATORI YOSHIRO, An ethno-historical investigation of the minority people in south-western China. *The Japan Science Review, Humanistic Studies* (1959) 10: 76-79. In English.
- SILVERBERG, JAMES, Caste-ascribed "status" versus caste-irrelevant roles. *Man in India* (1959) 39: 148-62.
- SOLLEN, NANCIE L., West Indian characteristics of the Black Carib. *Southwestern Journal of Anthropology* (1959) 15:300-307.
- . The nonunilineal descent group in the Caribbean and Central America. *American Anthropologist* (1959) 61: 578-82.
- SOUTHALL, AIDAN, An operational theory of role. *Human Relations* (1959) 12:17-34.
- SRIVASTAVA, S. K., Anthropology in India. *The Journal of Social Sciences of the Institute of Social Sciences, Agra* (1958) 1:17-28.
- STRETTIOVÁ, OLGA, *Baroque portraits*. Transl. HEDDA V. STRÁNSKÁ. 70 plates. London: Spring Books, n.d.
- Studia i Materiały do Historii Kultury Wsi Polskiej W XXIX i XX W* ("Studies and materials for the cultural history of the Polish village in the nineteenth and twentieth centuries"). 436 pp. Wrocław: Polskiej Akademii Nauk, 1958. Distributor: Polska Akademia Nauk, Nowy Świat 72, Warsaw.
- Studia z Dziejów Górnicstwa i Hutnictwa* ("Studies in the history of mining and foundries"). Vol. 1. 528 pp. English and Russian summaries. Wrocław: Polskiej Akademii Nauk, 1957. Distributor: Polska Akademia Nauk, Nowy Świat 72, Warsaw.
- SUTTON, FRANCIS X., Research and development in Africa south of the Sahara. *The Public Opinion Quarterly* (1958) 22:261-72.
- SWANSON, EARL H., JR., DONALD R. TOUHY, and ALAN L. BRYAN, *Archaeological explorations in central and south Idaho, 1958, I: Types and distributions of site features and stone tools*. Occasional Papers of the Idaho State College Museum, Pocatello (1959) 2. 104 pp. Multilith. \$1.00.
- TITLBACHOVÁ, SVATA, *Pośmiertny Rozpad Włosów* ("The posthumous decomposition of hair"). *Przegląd Antropologiczny* (1958) 24:109-14. With French summary. Distributor: Zakład Anthropologii, Viničná 7, Prague.
- Twenty-fifth Anniversary Bibliography of the Summer Institute of Linguistics*. 52 pp. Glendale, Cal.: Summer Institute of Linguistics, 1960.
- United States foreign policy: Possible non-military scientific developments and their potential impact on foreign policy problems of the United States*. A study prepared at the request of the Committee on Foreign Relations, United States Senate, by Stanford Research Institute. 86th Congress Committee Print (1959) 2. 100 pp. Washington, D.C.: U.S. Government Printing Office.
- VIDYARTHI, L. P. (Ed.), *Anthropology and tribal welfare in India*. 106 pp. Ranchi: The Editor, 1959. £2.
- WALLACE, ANTHONY F. C., Cultural determinants of response to hallucinatory experience. *American Medical Association Archives of General Psychiatry* (1959) 1: 58-69.
- WALLACE, ANTHONY F. C., and HAROLD A. RASHKIS, The relation of staff consensus to patient disturbance on mental hospital wards. *American Sociological Review* (1959) 24:829-35.
- WALLACE, BRUCE, and TH. DOBZHANSKY, *Radiation, genes, and man*. 205 pp. New York: Henry Holt, 1959. \$4.75.
- Serials**
- Antropologica* (1959) 7. 84 pp. Caracas: Sociedad de Ciencias Naturales La Salle.
- Archaeologia Polona* (1958) 1. 97 pp. In French. Warsaw: Polska Akademia Nauk, Instytut Historii Kultury Materialnej, Nowy Świat 72.
- Archaeology* (1959) 4, No. 1 (13). 64 pp. Cambridge, Mass.: Archaeological Institute of America.
- Archeologia Polski* (1957) 1; (1958) 2, Nos. 1 and 2. With Russian and English summaries. Warsaw: Polska Akademia Nauk, Instytut Historii Kultury Materialnej, Nowy Świat 72.
- Bulletin de la Chambre du Commerce et de l'Industrie du Katanga, Elisabethville, Belgian Congo* (1959), Nos. 207 and 208.
- Bulletin of the Department of Archaeology and Anthropology, National Taiwan University, Taipei* (1958), No. 12. 120 pp. In Chinese and English.
- Caesaraugusta* (1958) 11-12, (1959) 13-14. Zaragoza, Spain: Seminario de Arqueología y Numismática Aragonesas.
- Ergon I, Supplement of the Kwartalnik Historii Kultury Materialnej* (1958) 6. 318 pp. In Polish, Russian, German, English and French. Warsaw: Polska Akademia Nauk, Nowy Świat 72.
- Etnografia Polska* (1959) 2. 503 pp. Wrocław: Polskiej Akademii Nauk. Distributor: Instytut Historii Kultury Materialnej, Polskiej Akademii Nauk, Sebastiana 10, Kraków.
- Expedition* (1959) 1, No. 4. 40 pp. Philadelphia: University Museum, University of Pennsylvania.
- Kultuurpatronen* (1959) 1. 140 pp. With English summaries. Delft: Etnografisch Museum, Oude Delft 116.
- Kwartalnik Historii Kultury Materialnej* ("Quarterly, History of Material Culture") (1958) 6, Nos. 1-4. Warsaw: Polska Akademia Nauk, Instytut Historii Kultury Materialnej, Nowy Świat 72.
- Kwartalnik Historii Kultury Materialnej, Spis Treści Rocznika, Indeks Ilustracji V* ("Quarterly, History of Material Culture, Fifth Annual Table of Contents and Index of Illustrations"), 1957. 17 pp. Warsaw: Polska Akademia Nauk, Instytut Historii Kultury Materialnej, Nowy Świat 72.
- Primates, Journal of Primatology* (1958) 1, No. 2. 90 pp. In Japanese, with English summaries. Kurisu Inuyama City, Aichi: Japan Monkey Center.
- Publicaciones del Museo y de la Sociedad Arqueológica de La Serena, Boletín 10* (1959). 72 pp. La Serena, Chile.
- Revista de Guimarães* (1958) 68, Nos. 3 and 4. Guimarães, Portugal: Sociedade Martins Sarmento.
- Sovietskaya Etnografiya* ("Soviet Ethnography") 1959, No. 2. 182 pp. Moscow: Institut Etnografii Imeni N. N. Miklukho-Maklaya Akademii Nauk S.S.S.R., Volkhonka 14.
- Sprawozdania Archeologiczne* ("Archaeological Reports") (1959) 5. 304 pp. With English and Russian summaries. Warsaw: Polska Akademia Nauk, Instytut Historii Kultury Materialnej, Nowy Świat 72.
- Zpráva o činnosti Anthropologické Společnosti* ("Report of the activities of the Anthropological Society"). Zpravodaj Anthropologické společnosti (1957) 10, Nos. 1 and 2; (1958) 11, No. 1. Brno: Anthropologické společnosti, Komenského náměstí 2.

In
mia
ate-

pp.
isti-

Nos.
um-
uk,
nej,

et
lle,
008.
col-
van
pp.

14.
ue-

nik
6.
an,
ka

ro-
ou-
al-
na

la-
ty

th
ch

ej
l-
l-
ii

j.
ji
l-
ts
p.
r.
y

,
n
:

d
)

l

r

v

c

i

n

t

t

c

t

H

g

c

In
ia
e-

p.
ti-

ps.
n-
sk,
ej,

et
le,
08.
ol-
an
pp.

14.
ne-

nik
6.
an,
ska

ro-
bu-
ial-
ana

ila-
sity

with
asch

Inej
Cul-
Pol-
orii

Inej.
racji
Cul-
ents
pp.
osty-
owy

8y 1,
glish
ichi:

edad
n 10

and
Mar-

onog-
cow:
iklu-
S.R.,

theo-
With
War-
rytut
Nowy

polo-
f the
vodaj
) 10.
e: An-
ského

for use by the author, at the author's discretion; the other is directed toward discussion of the approach or issues raised in the article, and is sent to the author for the single purpose of writing a rejoinder if he wishes. Any such commentator contribution to a paper is acknowledged, at each occurrence in print, by a star (☆) after the commentator's name.

A fully processed and published review article, then, ideally consists of a basic paper, appended comments headed by the names of their authors, and one rejoinder to all the appended comments. Unsolicited post-publication comments on a review article are welcomed, and are considered for subsequent publication; such comments are needed to supplement those planned by the author and Editor, and to break the boundaries of specialization.

News and Reference Material

The category "news" includes important items of broad interest: announcements and reports of meetings and conferences; news of major discoveries; announcements of scholarships, fellowships, and grants. "Reference material" includes systematic guides to subjects of general interest—bibliographies of published bibliographies, guides to guides of research collections, etc.; directories of scientists and scientific institutions in relevant fields; lists of Ph. D. dissertations; research in progress; and other useful information. Also welcomed for publication are requests for information needed to pursue specific research, and suggestions for, and discussion of, research that needs to be done.

A Word to Contributors

CURRENT ANTHROPOLOGY is a world journal published in the English language only; thus contributors to it necessarily fall into two categories of persons, fluent or not fluent in English. Those who are fluent in English undoubtedly will prefer to submit manuscripts which are polished in terms of CA style (bibliography, illustrations, etc.); they should at once write to the Editor for a Style Sheet, and follow it carefully. Contributors who are not fluent in English should send their contributions in English, but they need *not* trouble about correctness of language or matters of style. The manuscript must only be sufficiently clear so that the Editor can advise the author on how it might be developed for publication. Later the Editor will co-operate with the author in the preparation of a final version for publication. If necessary, a small sum of money can be provided to help the author obtain a good translation into English.

Proofreading. The copyedited version of a review article, a publishable comment on a review article, or a lengthy reference-material manuscript, is sent to its author for his final review and approval before it is set in type. Thereafter, it is not altered unless unforeseen circumstances require. Other short contributions are sent to the author for final review only if they present special problems. Proofreading of all material, including both galley proof and page proof, is the responsibility solely of the Editor's office.

Reprints. Authors of review articles or of lengthy reference materials are given twenty-five free tearsheet "reprints" of their contribution, and may order additional copies, at cost, if they wish.

Calendar

1960

May 17–21. First Federal Science Congress. Salisbury, Southern Rhodesia. Sec. Gen., Dr. D. F. Mettrick, University College of Rhodesia and Nyasaland, Private Bag 167H, Salisbury, Southern Rhodesia.

July 18–25. 34th International Congress of Americanists. Vienna, Austria. Information: Prof. Robert Heine-Geldern, Institut für Völkerkunde, Reitschulgasse 2, Vienna I, Austria.

July 30–August 6. 6th International Congress of Anthropological and Ethnological Sciences. Paris, France. Chrmn., Prof. H. V. Vallois, Director, Musée de l'Homme, Palais de Chaillot, Paris 16^e, France.

July 31–August 5. International Conference on General Semantics. Honolulu, Hawaii, U.S.A. Gen. Chrmn., Dr. Shunzo Sakamaki, Prof. of History, Univ. of Hawaii, Honolulu, Hawaii, U.S.A.

August 10–17. International Congress of Orientalists. Moscow, U.S.S.R.

August 21–25. Louvain. August 26–27. Brussels. First International Congress of General Dialectology. Program Chrmn., Prof. Sever Pop, 185 Avenue des Alliés, Louvain, Belgium.

September. International Congress for General and Applied Phonetics. Hamburg, Germany. Information: Hans-Heinrich Wängler, Laboratory of Phonetics, University of Hamburg, Alsterglacis 3, Hamburg 36, Germany.

September 4–October 1. Regional seminar on "The Museum as a Cultural Center in the Development of the Community." Tokyo, Japan. Information: Mr. Hiroshi Daifuku, Museums and Monuments Division, UNESCO, Place de Fontenoy, Paris 7, France.

November 17–20. American Anthropological Association. 59th Annual. Minneapolis, Minnesota, U.S.A. Program Chrmn., Dr. Robert Spencer, Dept. of Anthropology, Univ. of Minnesota, Minneapolis, Minn., U.S.A.

December 26–31. American Association for the Advancement of Science. Annual meeting. New York, N.Y., U.S.A. Sec. Section H (Anthropology), Dr. James L. Giddings, Dept. of Sociology and Anthropology, Brown Univ., Providence 12, Rhode Island, U.S.A.

1961

August 21–September 2. 10th Pacific Science Congress. Honolulu, Hawaii, U.S.A. Information: Harold J. Coolidge, Sec. Gen., 10th Pacific Science Congress. Bishop Museum, Honolulu 17, Hawaii, U.S.A.

November 16–18. American Anthropological Association. 60th Annual. Philadelphia, Pennsylvania, U.S.A.

1962

November 15–17. American Anthropological Association. 61st Annual. Chicago, Illinois, U.S.A.

Meetings of broad interest will be announced as long in advance as known.

How to Pay

Subscriptions are payable, at the rates shown below, directly to CURRENT ANTHROPOLOGY, 1126 East 59th Street, Chicago 37, Illinois, U.S.A.

In each country, the Special Rate subscription (see inside front cover) is 40%, and the Associate's Fee is 20%, of the Subscription rate, and should, if possible, be paid directly to CURRENT ANTHROPOLOGY, 1126 East 59th Street, Chicago 37, Illinois, U.S.A. If easier and less costly to send funds to London, these may be sent, payable to CURRENT ANTHROPOLOGY, to Dr. Marian W. Smith, Royal Anthropological Institute, 21 Bedford Square, London, W.C.1, England. (But report all changes of address only to CURRENT ANTHROPOLOGY, 1126 East 59th Street, Chicago 37, Illinois, U.S.A.)

All subscriptions are on an annual basis, and will be entered to begin with the January issue of the year in which the subscription is received.

Subscriptions

Country		Country	
Argentina	P. 500	Mejico	P. 75
Belgium, Belgian		Muang Thai	Baht (Tical) 100
Congo	B. Fra. 300	Nippon	Yen 1500
Bharat	Rs. 25	Nederland	Gls. 27.50
Brasil	Cr. \$750	Norge	N. Kr. 37.50
Canada	\$10	Österreich	A. Sch. 150
Ceskoslovensko	Kcs. 100	Peru	Sol 100
Chile	P. 5000	Philippines	P 24-10
Colombia	P. 300	Polska	Zl. 125
Danmark	D. Kr. 37.50	Senegal	CFA 2000
Deutschland,		S.S.S.R.	Rs. 100
Bundesrepublik	DM. 30	Sudan	Pstre. 250
Egypt	Pstre. 125	Suomi	F. Mk. 2000
España	Pta. 375	Sverige	S. Kr. 30
Ethiopie	Eth. \$25	Schweiz	S. Fr. 30
France	N.F. 30	Türkiye	TL. 90
Ghana	Sch. 40	Union of South Africa ..	S. A. £2/10/0
Guatemala	Q. 5	United Kingdom	£2/10/0
Italia	Lit. 4000	U.S.A.	\$10
Jugoslavija	Din. 2750	Venezuela	Bs. 33.50

Current Anthropology

Sponsored by the Wenner-Gren Foundation for Anthropological Research, Inc., a foundation endowed for scientific, educational and charitable purposes. The Wenner-Gren Foundation is not, however, the editor or publisher of this journal, and is not to be understood as endorsing, by virtue of its grant, any of the statements made, or views expressed, herein.

Editor, SOL TAX

Associate Editor for News and Reference Materials, R. W. FORCE

Assistant Editors: ANNA M. PIKELIS, Review Articles

CHARLES CALLENDER, News and Reference Materials

Copyright 1960 by the Wenner-Gren Foundation for Anthropological Research, Inc.

Address all communications, including requests for permission to translate or reprint, directly to:

The Editor

CURRENT ANTHROPOLOGY

UNIVERSITY OF CHICAGO

1126 East 59th Street, Chicago 37, Illinois, U.S.A.



